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THE PHYSICAL BASIS
OF
MIND AND MORALS

BY
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CAMPAIGN."

THIRD EDITION

With numerous additions and emendations

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INTRODUCTORY TO THE THIRD EDITION.

It is gratifying to both the author and the publishers that a book upon the lines of a subject so abstract, has met with a fairly good demand. It indicates a growing desire among a large number of people to become informed upon the true nature of "mind" and "morals." The subject is yet comparatively new, and is exceedingly obscure, so that, in preparing for this edition, many emendations have been made in the text, which the author thinks will more fully elucidate the ideas intended to be expressed. In further exposition of the argument, a series of notes has been added by an appendix to the volume. These are referred to serially in the text, by numbers. It is hoped they will greatly assist the reader in grasping the scientific bearing of the facts. They, at least, will show, in many instances, that the author is not isolated in his views. The world, at large, is gradually replacing its heretofore supernatural conception of psychical phenomena, with another conception, that all phenomena, within the reach of man's perception are natural, and do not require the assumption of a personal cause, in order to be understood. If this book will hasten, even in the smallest degree, such transformation of the trend of human thought, the author will feel that he is thus amply compensated for writing it

CONTENTS

CHAPTER	PAGE
I. A SHORT OUTLINE OF THE PRINCIPLE OF EVOLUTION	16
II. CHARLES R. DARWIN—THE EXPONENT OF EVOLUTION	75
III. AN INTERPRETATION OF HERBERT SPEN- CER'S PHILOSOPHY	110
IV. THE RHYTHM OF MOTION.	141
V. HUMAN KNOWLEDGE AND ITS LIMITATIONS	162
VI. THE PHENOMENAL EGO.... .	215
VII. THE MATERIALISTIC BASIS OF ALL THINGS,	253
VIII. NATURAL MORALITY	294
IX. LIMITATIONS AND IMPEDIMENTS.... .	340
X. SUMMARY	368

THE PHYSICAL BASIS OF MIND AND MORALS

INTRODUCTORY

It is apparent to the most casual observer that all forms are in constant process of change. This fact is very significant, and is a necessary antecedent or condition of the principle of evolution. The immense bodies of granite, which seem to be the solid foundation on which not only the mountains are laid, but the very earth itself is built, have all the molar motions of the earth, and also the slow change of molecular motion implied in the principle of evolution.

As the latent heat of the earth is slowly radiating into space all the constituent elements, the rocks, soil, water, and atmosphere, are correspondingly changing. The "fixed stars" are not permanent in one place for a moment, although the human eye can perceive no change in their relative positions during the lifetime of man. And yet nothing is changed either in quality or quantity. It is only a change of form. All past combinations of matter and motion have given way to the present status and this is fast changing to forms better adapted to new correlations. Form is evanescent, and we do not know anything abiding

except the interchange of motion and matter. These changing forms constitute functions, or phenomena. These are the only objective things which, being represented in our senses, produce in us what is termed consciousness. Phenomenism is really the relation of everything in the universe to every other thing. Our mentality is our correspondence with this relationship.

I have tried to show in the following pages that there is no other meaning of these facts than that which we derive from phenomena; and that wisdom teaches us to waste no time in conjecture about so-called "ultimate reality." Our brains, however, do perceive these phenomena. Upon such knowledge alone can we base our lines of reason, memory and will. The rules of our personal and social lives must be derived from such knowledge as our brains can acquire from these phenomena. Dietzgen says there is nothing behind phenomena except the universe. The latter being infinite can have no other infinite as its creator. Mankind persistently ignore the importance of the phenomena in a delusive desire to see what is behind and producing them. They look over the knowable, in an endeavor to see the unknowable; and supposing that to be a personality, like themselves, give it a subjective existence. The following pages give the author's argument for the futility of this process.

The psychology of our lives consists of the correspondence between the relations within ourselves and the relation these phenomena bear to each other in the environment. In other words, we know only the relativity of things. We perceive that one form attracts every other form and has extension and resistance. Cognizing these facts we call the objective thing mak-

ing these impressions on the brain,—matter. We know it only by these attributes, or relations. Our consciousness is the aggregate of the images these objective relationships make upon our very complex nerve structure; and the brain centers of reason, memory, imagination, and will are stations in the neural arcs co-ordinating these images into ideas.

The avenues of this correspondence are the special organs of sense, and the presentations thus made become transformed by the very complex structure of the brain, by the molecular motion of its atoms, into all the various forms of cognition, heretofore mis-called faculties. It seems impossible to study the psychological phenomena without assuming a subjective and an objective aspect. But both are one phenomenon in their co-relation to all other forms of matter and motion. It seems plain that the impression made by the transformed image upon the sense organ, e g., the eye, is a natural mechanical operation, similar to the image in a mirror. But the instantaneous reproduction of the same image on the cortex of the brain centers, and the simultaneous production there of similar and contiguous images of past impressions, or memory, the fusion of these like images into a condition called perception or feeling is a process so obscure as to appear, to the unscientific, the act of a supernatural power.

How the feeling comes and how the ideas are formed and recalled would be as much unsolved problems as they were in the days of Descartes and Kant, except upon the hypothesis that the images are the feelings, and the ideas in due order are the fusions of like images. The process is wholly natural and physiological. However mysterious the appearance of

the psychic effect may be, the fact remains that apparently only those organisms with a certain development of nervous material centers are capable of forming and expressing ideas, that is, there is no thinking without nerve matter. The cessation of the phenomena of movement we call life ends all psychical phenomena for that organism.

It may be, therefore, that the energy, or force manifesting in vital movements, is the causative of both the physiological and psychological phenomena in the living organism and that they are two aspects of the same force working through differentiated plexuses of nervous structure. This seems to be the view of Herbert Spencer. If I understand Ribot, this is his view, and perhaps to a less extent that of Prof James R. Angell. But they are all silent as to the real process that occurs after the sensation reaches the cerebrum and is there transformed into the psychical element of a condition we call consciousness. They do not say that molecular motion produces the thought. The reason of this is that this physical process in the brain is not felt by the individual, and dissection of the brain cannot be made while the process is going on.

I assume, in the pages following, that this connecting link between the sensation and the perceiver of it is simply a continuation of the same physiological process that we observe up to that point, and from that point to the physical effect in external muscular movement. It is molecular motion of the nerve tissue.

The following chapters endeavor to place limitations upon the imagination; and to bring within the operation of practical reason the phenomena of the primal emotions,—fear, affection, and anger. When one discovers that his organism is only a part of cos-

mic phenomena, and is entirely dependent on these for its existence, he should then turn his thoughts in full upon the great importance to his welfare, that he acquire correct ideas of such relationship. His philosophy of life largely depends on the view he takes of the method of thought. If he is to acquire such ideas as his brain is capable of producing, he will then have no time left for thinking of unknowable causes behind the phenomena, by which alone he cannot arrive at any idea. In this sense these chapters are strictly utilitarian, or pragmatic.

One of the most interesting features of the study of a subject like psychology is the discovery of the intellectual tendencies of different authors. Herbert Spencer, Th. Ribot, Romanes, Angell, Wundt, and Haeckel use different terms frequently to express the same meaning, no two of them express themselves the same way, even in arriving at the same conclusions. Haeckel, Romanes, and Angell are simple, direct, and easily understood. Ribot and Wundt are very learned and extremely scientific. Wundt goes into the most elaborate diagrammatic explanations of the anatomy and physiology, as well as the psychology, of the organism, resolving all three elements into still other elements, and working out what he calls a "*schema*," and finally establishing an hypothesis that neither the anatomy nor the physiology will account for the psychology, although he admits that without both there would be no psychology. As anatomy treats of material substance and physiology of function,—a form of motion,—the two being the elements of every organism, if psychical phenomena require still another unknown element to account for them, Wundt may in future volumes, not yet published in English, and un-

read by me, be able to find something more in them than matter and motion. But I think he will not.

Wundt says that the association centers of the brain are connected by innumerable conduction paths. That it is probable that every idea, while initiated by the sensory paths, yet is contributed to by numerous other associative centers, through which run the nerve fibre conducting the particular sensation. Not only the anatomical centers contribute, but the content of the idea is more or less determined by the direction of the sensation. Now, if the character of the idea, or the contents of it, are thus determined by the particular center cells acting upon the sensation, and also by the direction taken in its passage to its appropriate center, where the idea is finally formed, there must be some process, chemical or mechanical, which occurs to the grey matter of these various paths of conduction, that when completed is the sensation, feeling, or idea. The coincidence of objective energy forms new combinations in the molecules of nerve tissue, these new combinations being the psychical effects, the whole being a natural phenomenon. Or, we must assume an unknown supernatural power using this complicated and ever changing neural machine as a process or method of working out the raw material of sensations into the ideas. The latter is the theological view accepted by the great majority of Christendom. The anatomy and physiology are plainly visible to the eye of science. The resulting psychology, —or psychic phenomena,—are plainly perceptible. The question then is, "Are the psychic phenomena, which always accompany the plainly perceptible functions of the neural structure, the natural effects of those functions, or are they really produced by some

other power, i. e., spiritual, working through the structures and functions? Ribot and Spencer say the function is the idea. Wundt says he cannot find the nexus, by any measurable process, but that the idea of an independent force or power causing the psychical upon a physical substrate is not incompatible with the facts. My contention is that it is not an independent force, because the idea is formed only when the nerve matter acts.

The different chapters treat of the different aspects of the same phenomenon. Evolution is a continual change of form, which is the same as saying a serial differentiation of the relational element in monism. Darwin and Herbert Spencer being the most prominent exponents of the principle of evolution, the chapters devoted to them naturally follow that on Evolution. "Rhythm of Motion" is a condition and a universal accompaniment of all phenomena. The chapters on "Human Knowledge," "The Phenomenal Ego," "The Materialistic Basis of All Things," "Natural Morality," and "Limitations and Impediments" are all treatments of the different aspects of the relation the Ego, or self, holds to other things. This relation is the determining factor in any natural code of ethics and is the basis of any rational philosophy, or religion. It is theoretically the basis of supernatural religion. But, before there can be any relation between things, there must be objective realism in the things related. This is absent in theology. To the self this must be sensory realism, not imagination nor superstition. In other words, all phenomena are alike in cause, and therefore the following treatment of them is materialistic monism.

I may be accused of either inconsistency or ignorance in advocating phenomenism and the actual existence of objects at the same time. Phenomenism is the name of what we do perceive. But that perception, being accomplished by means of our sense organs in a natural way, gives us the evidence of actual objectivity. For example, waves of light falling upon the retina produce an image of a tree. Putting forth a hand, the touch and resistance verify the vision, and disclose a peculiar form. Waves of sound impinging on the drum of the ear convey the rustling of the leaves, and the swaying of the limbs in the wind. Evaporation from its leaves, blossom and bark excite the sense of smell. Its bark, or wood, or leaves, or fruit can be tasted. Thus the five senses receive impressions, or images, of phenomena or attributes. These images fuse in the brain centers of these sense organs with former like images that have come in the same way to the brain, and the resulting image is that which the speech center formulates by the word "tree." The idea that a "tree" exists at the location thus designated by the brain is the psychological result. This is the objective fact present in consciousness. The objective "tree" produces the images, and unless there was what we term reality there in the form of color, resistance, size and shape, which we designate "tree," no images would appear, and no idea would arise. We know this from the further fact that these same images, followed by the same idea of "tree," are made upon other brains. There is also another test. Remove the fact, or objectivity, by cutting down the "tree" and burning it; that is, change its form to invisible gases, and not any further images of that kind are formed on the brain from that par-

particular thing. There may then be only memory images formed, but only in the brains of those who before saw the real tree. Therefore the process in the brain that before produced the idea "tree" is incapacitated by the elimination of the objective fact from reproducing the same idea, except in memory. The brain does not create the objective fact, the "tree," but the existence of the "tree" is the cause of the idea. Should the image of a tree in that locality be formed on the brain of one who had never seen the original tree, when the touch should show there was no "tree," then it would be hallucination. Such perception would be abnormal, and other normal brains would not perceive anything.

Take away the attributes of any object until all that are perceptible to the senses are gone and what would be left? Nothing. If that is the "thing in itself" then there is to us no "thing in itself." I, therefore, think I am justified in using the word "phenomenism" in connection with the phrase "real objects in the environment." That is, real things are those objectivities that make sensations on normal brains. Phenomenon to the brain is a real object. The visions of the insane are not normal phenomena.

The author does not claim to have discovered any new scientific facts. But as no two brains can express the same facts in exactly the same way and seldom draw the same conclusions from them, he hopes that his expression of the well-known truths of natural phenomena may be new to some readers. He has made use of as simple language to express the ideas as seem to him compatible with accurate thought.

There are numerous words used that convey metaphysical meaning, that is, impersonal forces and

things are represented as functioning in a personal way. This could not well be avoided without making the treatment too technical for a popular treatise. The words and phrases are not intended as metaphysical but as figurative only. For instance, when Nature is spoken of as being infinitely kind to those who obey her laws, the language is merely figurative. Nature is only the aggregate phenomena, or the persistence of force. In no sense is it transcendent in the Kantian sense, nor is it a personal entity having feelings like the human body during its life. The unity of the boundless universe, in its interaction of matter and motion, is so harmonious with the molecular motion of the same matter in the human brain that the harmony is but conceived at present by the majority of mankind as that of a personified objective. That is metaphysical. Ordinary language, in its entirety, has been evolved to correspond with that conception; and to use any other language, in that connection, would make it more obscure to the average reader and much less likely to be read. The latter fact is my only justification for a seeming lapse of scientific treatment. It must be remembered, also, that scientific language is only more descriptive than metaphysical language, not any more explanatory. The words "physical," "psychical," "inherent," "tropism," "force," "energy," "dynamic" and "pyknotic" are mere symbols of what is observed by the human senses. They are descriptive only of the phenomena. All language is confined to either a description of phenomena or to what man has imagined may be behind and causing it. The language based upon the latter is also merely descriptive of a modification, or variation of phenomena, generally of man's own person

and powers. So that, with this explanation to prevent misunderstanding, I deem it to be in the interest of simplicity and clearness to use common language in those connections in which it is used.

I hope the readers will not conclude that this book was written with any idea of pointing a way to avoid the responsibilities of life. It is rather intended to meet the responsibilities in what I think is the only way they can be met successfully. The successful meeting and solving of life's problems alone can bring happiness to the individual and a more desirable civilization to the world. Hopes and aspirations should be based on what science has proved to be the logical theory of cosmical philosophy, and a religion should be based on those facts.

CHAPTER I

A Short Outline of the Principle of Evolution

There are two theories of the method by which the perpetual apparition of natural phenomena throughout what is called the visible universe has been produced. One is the theory of special creation; that is, that a Supreme Being, called God, created out of nothing all that is. This does not pretend to give the real origin of matter and motion. Because saying that they came out of nothing is not accounting for them. It is the same as saying that the subject is beyond our mental capacity. There is no nothingness. Nothing is only a relative term. The other theory is called evolution. This theory assumes that matter and force always existed, that to try to find origin, is useless, and that from these two, always acting together, have evolved the perpetual apparition. "Evolution is a change of form, through the production of new configurations."* The most comprehensive definition, however, one that covers both organic and inorganic evolution, is that given by Herbert Spencer in his "First Principles." "Evolution is the integration of matter and the concomitant dissipation of motion, during which the matter passes from an indefinite, incoherent homogeneity to a definite, coherent heterogeneity; and during which the retained motion undergoes a parallel transformation."

It will be seen that this definition describes, in technical language, the transformation of a nebula

*Dr Paul Carus

into the solid bodies of the solar system, as well as the integration of a condensed form of matter, probably by chemical combination, into forms of life. The integration of matter composing the nebula into globes, and the concomitant dissipation of motion in form of heat and energy,—the same as is now going on in the sun,—is a theory accepted by all physicists, so far as I know. The nebular theory of Kant, Laplace, and William Herschel, in accounting for inorganic evolution, presupposes the homogeneity and gaseous condition of all matter; and from that nebular condition the present heterogeneous stellar universe has been evolved. The greatest advances in astronomy made in late years have been the disclosures, by photography, of nebulosity existing throughout space. More than 120,000 nebulae are now known, and by observing these, astronomers are studying the phases through which our earth and solar system seem to have passed.

The theory presupposes that the nebula, from which the sun and the planets, for example, have integrated, filled the space within the orbit of Neptune with homogeneous matter in a gaseous state. Or it is likely the nebula extended a sufficient distance beyond that orbit to leave Neptune in the relative position it now occupies in the solar system after the subsequent concentration of his arm of the original nebula. Granted the existence of this nebula, and the attraction of gravitation, and it can be proved that condensation would begin. In the process of condensation* a rapid circular or spiral motion would be set up, and, by the force thus generated, the different planets would eventually be

* See Chapter 4 in explanation of J. C. Vogt's Principle of Matter viz. Condensation.

formed upon self-appointed centers in succession, each planet representing a minor center of condensation, and being at first a mass of incandescent gas. The momentum of each planet given it while remaining a part of the nebula would keep it moving. The velocity would increase as the planet solidified; and the pull of the central mass would convert this forward motion into motion in an elliptical track; the law of moment of momentum would perpetuate the character of the motion begun in the nebula, resulting, in the course of untold ages, in the separate planets as we now behold them, moving in perfect harmony in their co-ordinated orbits around a central sun. The sun is a more condensed portion of the original nebula, still shrinking, and its heat is produced by the friction of condensation. It is said there is still existing the original amount of energy in the solar system, and that whatever occurs, none of it is lost and none gained in the aggregate. This is the conservation of energy. When energy seems to be lost it has only taken another form. Should all the bodies of the solar system come together in such way as to reform the nebula, would there be in such resulting nebula the same force in quantity and power which in the original nebula integrated the solid bodies and their motions as they now exist? The present mathematical method of solving this problem, I believe, would answer this in the negative. But nebulae are not formed in this way.

The moment of momentum remains always the same, and this is the product of mass multiplied by the velocity; and that product again multiplied by a perpendicular drawn from the center (such as the sun) to the line of direction of the moving body; for

instance, the orbit of the earth. The moment of momentum of a system like the solar is the aggregate of that of all the bodies composing it. Energy is the aggregate work represented in phenomena. The multiplicity of effects, in the process of evolution, as well as the process itself, are phenomena. The energy of the solar system is represented in the quantity of work which could be done if all its bodies came together. The energy of each of its bodies can be ascertained by multiplying one-half of its mass into the square of its velocity. I conceive that the persistence of force, which is the most important law of physics, and is perceptible to our senses in attraction of gravitation, molar and molecular motion, chemical attraction, in short, in the sensory perception the eye has of environment, is the manifestation of energy—it is the same power that theology has personified and given intelligent control of phenomena. Or, perhaps it would be more accurate to say that the first conception by man of an omnipotent power was not that of natural energy, or the persistence of force, but of a personality above, or beyond, and producing phenomena

It must be understood, also, that a separate system, like the solar, or any nebula, is constantly losing energy, in the form of heat, by condensation. As it loses energy its motion decreases, and as its motions change, so does the relative position of its bodies, at the same time the relativity of its atoms changes; but there is no evidence that they will ever come to absolute rest even when all its matter comes together in one body. The movement of the atoms in the process of condensation is called arrested motion. (See "Rhythm of Motion" in Chapter IV.) The term "sep-

arate system," used above, must be taken to mean separate in form only. There is no "system" in reality separate from the general monistic system, constituting what we call Nature.

According to Sir Norman Lockyer the meteoritic hypothesis should modify the nebular hypothesis. He contends that comets and many so-called stars consist of swarms of meteorites, which though normally cold and dark are heated by repeated collisions and so become luminous. In time the force of gravity condenses the meteoric swarm into a single globe. Some of the swarms are members of the solar system, and some of them travel around the sun like planets. Chamberlain calls them planetesimals: "The planetesimal theory is a development of the meteoric theory. . . . It regards meteorites as very sparsely distributed through space, and gravity as powerless to collect them into dense groups. So it assigns the parentage of the solar system to a spiral nebula composed of planetesimals and the planets as formed from knots in the nebula, where many planetesimals have been concentrated near the intersection of their orbits. These groups of meteorites, already as solid as a swarm of bees, were then packed closer by the influence of gravity and the contracting mass was heated by the pressure, even above the normal melting point of the material, which was kept rigid by the weight of the overlying layers." (Prof. J. W. Gregory before the section of geology (1907) of the British Association.) It is evident that this theory coincides with the laws of inorganic evolution as much as does the nebular theory. It concedes the existence of spiral nebulae, but they are composed not of incandescent gases but of swarms of meteors made luminous by

collision. From these meteoric nebulae the stellar bodies are evolved. But the meteors are composed of compound elements and must have been evolved from simple atoms or ions. The nebular theory begins with the simplest hypothetical forms of matter and carries that to the formation eventually of bodies like the earth. The other theory seems to fail to account for the evolution of the meteors, which are nearly as complex in structure as the rocks of the crust of the earth. Either theory comports with the principles advocated in this treatise. The theory of this book leads us to assume that the matter of the universe was never homogeneous. There was no beginning and will be no end to phenomena. The theory now seeming most plausible is that world bodies are evolved from nebulae. These are produced by collisions of celestial bodies after they have become dark and cold. Such bodies may sometimes wander for a hundred thousand billion years before colliding. The nebula resulting from collision will have a central portion of high density surrounded by a gaseous envelope illuminated by the friction of its particles. The violent rotation given it by the collision, together with the centrifugal forces, will give a disk-shape to the central mass. Meteorites, or planetesimals penetrating the nebula integrate upon themselves the gaseous matter and taking the motions of the nebula form centers of potential planets. The rotational movement and the concordance of plane and direction of it thus acquired in the nebula by these nascent planets will remain with them for all time, with slight modification of velocity, and distance from the central body. The central mass will remain infinitely larger than the aggregate planets evolved and by the radiation of heat

and the pressure of this radiation will provide the planets with the conditions of life.

Nebulae are seen everywhere in space and celestial bodies are as widely distributed. Therefore all forms of energy, such as heat, that are being radiated, while the evolution of worlds proceeds, are not lost. They hit upon either the nebulae, or the bodies evolved from them. While our sun radiates 2260 million times more heat than the earth receives, yet the excess finds places in the cosmical phenomena for its utilization. Every ray of light from any star will eventually be transformed by some other body. Life could not exist, and phenomena could not occur without the constant radiation from a hot body to the colder surroundings of space. A homogeneous and equilibrated condition of all or any of the substance and energy is incompatible with this theory. But the rhythm of the production of nebulae by collision, and the evolution of bodies from these, in the manner above mentioned, are the only tenable statements that can now be made.

Chemists have known for many years that all the matter of our earth can be reduced to about eighty elements. There are many facts which indicate that these are merely varying forms of one primeval element, yet undiscovered. "The elements that form one per cent or more of the earth's crust are only eight in number. They are given in the following table:

	Per cent.
Oxygen .. .	47.02
Silicon . . .	28.06
Aluminum . . .	8.16
Iron - - -	4.64
Calcium	3.50

Magnesium	- - -	2.62
Sodium	- - -	2.63
Potassium	. . .	2.32
Total . . .		98.95

The elements forming less than one per cent, but more than one-tenth of one per cent of the earth's crust, are titanium, hydrogen, and carbon. It will be seen from these figures that neither the common compounds nor the common elements are bewildering in number. Examples of the chief rock-forming minerals can be found in nearly every locality.”*

The materials of the sun, planets, stars, and nebulae are essentially the same as those of the earth. The spectroscope has revealed this fact. The elements of which the earth is composed, when heated to incandescence, produce in the spectrum the same lines that some parts of the light of the sun and the stars and the nebulae produce. “Is not this a weighty piece of evidence in favor of the theory that earth, sun, and planets are all portions of the same primeval nebula, in which these elements are blended?”** Neither Laplace nor Kant knew of this evidence, yet they gave the theory the support of their names upon the evidence of other facts, Laplace deducing it from the theory of probabilities. One fact in nature strikes one very forcibly as at least a strong inference in favor of the nebular theory. Heat, in sufficiently high temperature, resolves all solids into gases. In the sun's pho-

* Carl H. Paddock of Colorado in an article entitled, “An Introduction to Geology,” in the *Mining Record* of September 23, 1905

** Ball's “Earth's Beginnings” P 290.

tosphere the spectroscope shows that many metals and similar elements that are in a solid form on the earth are components of the gases of the sun. It is not only known that the gases of the sun are gradually condensing as heat is radiated, but that when, under the blow pipe in the laboratory, a solid is converted into gas, that the reverse process occurs when the heat is withdrawn, viz., the gas naturally condenses into the former solid condition. Even the atmosphere can be condensed into a solid. All heat has its origin in the sun, and is produced by the condensation of its units radiating heat by friction. The inference is, that all matter has been condensed from a nebulous condition in this way.

The other evidences of inorganic evolution are the remarkable concordance of the planes of the orbits and the motions of the planets therein around the sun, and the still further concordance of the orbits and motions of the satellites of the planets with the orbits of the planets. The greatest inclination that any of the planes of the orbits of the planets have to the plane of the ecliptic is 7 degrees, that of Mercury. All the bodies move in the same direction, and this direction is that in which the law of mechanical motion in a nebula proves they would move on the nebular theory. The satellites of Uranus and Neptune alone revolve in a direction opposite to that of the others, but the motions of those planets themselves correspond with the theory. There is a sufficient explanation of this anomaly; and the conclusion of astronomers is that these satellites will revolve later on in the true direction.

The satellites of Uranus revolve around the planet in one plane, inclined 83 degrees to that of the eclip-

tic, and in an opposite direction from the motion of the planet in its orbit. The law of dynamics implies that this means an excess of energy,—the inner satellites making a revolution in one and a half days,—which in the course of ages will be regulated by gradually lessening this angle of plane and decreasing the velocity. At first the angle will rise to 90 degrees, and then continue on the other side until it reaches 180 degrees.

This would bring the motion in the right direction; not by any change in the absolute direction of movement of the satellite, but by lessening the energy of the movement and at the same time increasing the angle of its plane to more than 90 degrees. This will bring the motion that now appears to be in the opposite direction into the same direction with that of the planet, or from retrograde to direct motion. This is likely what will occur to the satellites of Uranus, as well as those of Neptune. The latter are now only at an angle of 35 degrees to the ecliptic, but it is supposed that this plane will pass through movements parallel to that of the satellites of Uranus.

“The movements of the satellites of Uranus and Neptune do not disprove the nebular hypothesis. Rather they illustrate the fact that the great evolution which has wrought the solar system into form has not yet finished its work; it is still in progress. The work is very nearly done; and when that work shall have been completed, the satellites of Uranus and Neptune will no longer be dissociated from the general concord.”*

* “The Earth’s Beginning” P. 347.

Organic Evolution.—In the earlier stages of the evolution of the earth there could have been no organic forms, such as we know them now. But if the nebular theory is the correct one, there came a time in the condensation of our globe, after it had passed through a gaseous, then a fluid, and then assumed a comparatively solid form, that the surface temperature became greatly reduced. At some favorable juxtaposition of earth, air, temperature, and moisture, life must have arisen from inorganic substance in a manner entirely unknown to us, except by scientific inference, no man being there to see it, at first in a very lowly form by a combination of elements which we find in all organisms,—carbon, hydrogen, oxygen, and nitrogen. As shown heretofore, three of these elements form a large part of the earth's crust, and nitrogen is one constituent, very large in bulk, of the inorganic atmosphere. The evolution of living forms, as we now see them, from the first true moner, which perhaps came into existence in a natural way in many places at the same time, is what we mean by organic or biological evolution, as distinguished from the older theory of special creation. It followed after inorganic evolution as a natural result of the upward or progressive change of matter from the homogeneous to the heterogeneous. Probably life began in the water. Certainly the lowest forms of life are marine. From these by gradual hereditary variation in form, and the integration of matter from the immediate environment, all species were developed.

It is not possible to put into artificial time the period life has existed on the globe. Joly says that about a hundred million years have passed since the age when the oceans originated. The temperature of

the earth in this time fell from 365° , the lowest at which water vapor will condense to liquid water, to its present temperature. Life forms soon appeared in the ocean, which did not differ so very much from those now existing.

There is another theory of the life germ worthy of mention. We know matter and energy, or rather that aggregate of sensations which we call by these names, could have no origin, because it has been inductively demonstrated, that both are indestructible. It is probably the same with life. Arrhenius holds that life spores arise only from other life spores and that such spores may be carried through inter-stellar space and still retain power of fertilization on distant globes. This theory would class life spores with indestructible matter and energy, to which the word "origin" should not apply.

All organisms now develop from an egg-cell. Here and there a scientist asserts that life is now arising from the inorganic by archebiosis. But the propagation by cells is the process apparent to everybody. All animals begin their development from a cell from 1-120 to 1-100 of an inch in diameter, having the same formation and the same composition in every instance. The worm that crawls on the ground and man who is the most complex and heterogeneous of organisms have precisely the same beginning in an egg-cell. But the egg-cell of man has altogether different potential energy from that of the worm. This difference is not perceptible until the development occurs. Two cells appearing alike may develop, one into a man. and another into a worm. I have not yet seen it stated that even microscopy can discern in the cell forms the potential difference of the two cells

The unicellular protozoon, which never develops beyond one cell, but grows in bulk only, differs from the multicellular metazoon in its beginning, not in the size or form or substance of the cell, but in the absence of fertilization of its nucleus; and the consequent addition of new cells in building up a multicellular organism. A multicellular organism grows by fission, but in doing so the birth of new cells is accompanied by a membrane that holds the cells together. The important fact is that in its beginning every animal, also every vegetable, is a cell analogous, if not homologous, with every other in appearance. That fact, coupled with another fact in embryology, viz, that all mammals, including man, in their embryological development, before they arrive at the mammalian form, parallel the embryological forms of all the animals below the order of mammalia, viz, radiata, articulata, molusca, and fish and reptiles of the order of vertebrata, is very strong evidence that they were, at some period of their development, existing in the adult form of these lower orders. This is strong and very convincing evidence of derivation from lower orders by variation and inheritance. There are scientists, however, who deny the exactness of the parallelism. Montgomery in his "Analysis of Racial Descent" contends, in his chapter on "Parallelism of the Ontogeny and the Phylogeny," that when a variation occurs that is racial there is not only a modification of the matured form, but what makes the variation racial is the fact that the germ cell is modified correspondingly. Therefore all subsequent embryos are modified not only at the point where they assume the form of the new race but at all stages, prior as well as subsequent. So that there cannot be in such embryos,

which means all embryos, any real parallelism between the ontogeny and the phylogeny. "The relation between the two is always that of an inexact parallelism." I take this to mean that in a general way there are points in the ontogeny that can well be interpreted as indicating a parallel to the phylogeny. More thorough experimentation is needed in embryology to determine in just what points the parallelism consists.

Classification, Morphology, Embryology, Paleontology, and Geographical distribution all contribute innumerable facts to the theory of evolution. These are all mentioned by Darwin in his "Origin of Species," or by some of his numerous disciples. It seems almost trite to the students of these exceedingly interesting and important sciences to recite any of them here; but I think it will be instructive to give one or two facts from each of these five great divisions of Natural History. They are wonderfully interesting evidences of the principle of evolution.

Linnaeus, Cuvier, and all naturalists who undertook to reduce the innumerable living organisms on the earth to an orderly system, soon discovered analogous structure and function in all. They easily divided them into two kingdoms, the vegetable and the animal. Space will not permit citations from the vegetable kingdom. But the animal kingdom is made up of such numerous diverse forms that, unlike vegetable forms, move from place to place, that it required wonderful intellectual ability and judgment to so arrange them in groups subordinate to groups having such abiding characteristics in common, that the members of each group could always be properly placed by means of these characteristics. At first it was thought that those structures whose functions

were of the widest use to the individual and most apparent to the eye should be taken as the abiding characters for classification. But experience demonstrated that really the most persistent structures,—and the most helpful in classification,—were the more obscure and the least useful. This is also a very strong proof of evolution, or derivation by variation and inheritance; because if, for example, all the vertebrates have backbones internally, and the orders of that division include such wonderful differences of form and structure otherwise, as fish, reptiles, birds, and mammals, then all these differences must be variations of and derivations from a common ancestor, having only one form and a backbone. Man's vertebral and mammalian structure does not dissociate him from the order of vertebrate mammals, although his brain and its psychical manifestations do. But the latter are such variable qualities that they cannot be used as bases of classification. They are secondary characters, having grown out of the physical. The physical and genealogical alone can be made the basis of classification. He therefore must be classified as a family of the order of mammalia. He was therefore not *created* at the head of the animal kingdom.

Classification of plants and animals is made in groups subordinate to groups. This can be done only because of structural resemblances and structural differences. For example, a porpoise lives in the water and has the form and habits of a fish. Under the biblical classification it would be called a fish. Yet it gives suck to its offspring and is therefore a mammal. It is rare to find a mammal an inhabitant of water. The order as a whole is terrestrial. Yet it is clear that the whale and the porpoise, on the theory

of descent from a preceding form common to all mammalia, by so decided a change of habits from land to water, changed only such structure as was necessary to adapt them to marine habits. But the structure necessary to suckle the young persisted in the new habitat. It is this persistent but less apparent structure that classifies them and not the more adaptive structures of legs and feet changed to paddles, and the¹ terrestrial general form changed to the shape of fish.

The advances made in the method of classification from time to time, from the purely artificial plan of Moses down to the more natural system of Cuvier, while not so intended by the classifiers, yet at every step showed more clearly the close genetic relation of all plants and animals. Had these naturalists entertained the theory of descent by modification, as taught subsequently by the theory of evolution, they could only in a few instances have made their classification more complete. evidences of that theory All classification not only shows close affinity, accompanied by modifications, but a gradual advance from the earliest fossil forms, in heterogeneousness,—a constant multiplication of effects and a development from the simple to the complex. These are the cardinal principles of the theory of evolution

As to morphology all animals are remarkably alike in form and growth. A tiny round cell in the embryo is common to all at first. From that period to the adult form there are innumerable points of homology and more of analogy. The embryological form common to all animals is the first to be developed in any vertebrate; this is the formation of a round ball of cells held together by a membrane, the gastrula. Then follow, in regular order, the structures common to

the radiata, articulata, mollusca, and then the vertebrata; and lastly, appear the characteristics marking the species to which the embryo belongs. And on the upward development, each species carries with it, in vestigial form, many structural organs, useful in the lower forms, but useless, or even harmful in the higher. In the human body we have hair covering the foetus, and shed prior to birth; the thymus gland; the muscles moving the scalp, the ears, and other parts of the skin; the peculiar fold in the tip of the ear; the hair on the arms; the valves in the horizontal and not in the perpendicular veins; the pineal gland in the brain, the semi-lunar fold in the eye; the coccyx, or trace of tail at the end of the vertebral column; the milk teeth. All these are what are called rudimentary organs. None of them,—save possibly the pineal gland,—plays any appreciable part in the human economy. Some of them, as the hair on the arms and the valves in the (now) horizontal veins, would have been useful to an animal walking on all fours. Others, as the vermiform appendix, would be useful to an animal whose diet was chiefly fruit. On the theory of special creation, how shall these rudimentary organs be accounted for? Being of no use to the organism why should they have been created in it? But on the theory of evolution, by variation and heredity, they are understandable.

“Comparative anatomy proves to the satisfaction of every unprejudiced and critical student the significant fact that the body of man and that of the anthropoid ape are not only peculiarly similar, but they are practically one and the same in every important respect. The same two hundred bones, in the same order and structure, make up our inner skeleton; the same three

hundred muscles effect our movements; the same hair clothes our skin, the same groups of ganglionic cells build up the marvelous structure of our brain; the same four-chambered heart is the central pulsometer of our circulation, the same thirty-two teeth are set in the same order in our jaws, the same salivary, hepatic and gastric glands compass our digestion, the same reproductive organs insure the maintenance of our race"* And he should have added the same physical and mental habits, the same sleeping and waking; the same emotions of fear, anger, and affection; subject to the same diseases and the same death. The same medicines have like effects on man and monkey, horse and dog. Under like environment the monkeys, in less degree of intellectuality only, respond to like excitation of their peripheral nerves in the same manner that man does.

It is a well known fact that in the decline of vitality accompanying old age, the functions last developed are the earliest lost. The term "second childhood" is the popular recognition of a profound psychological truth. The highest intellectual functions soonest fade, while the instincts and emotions, which existed almost at birth, remain to the latest breath. These phenomena, which accompany normal senile decay in man, are strikingly similar to those which the vivisectionist is able to produce with his knife.

Remove the cerebral hemisphere of a pigeon and it returns to a condition closely resembling that of the newly hatched bird,—it will swallow food placed in its mouth, and if you turn it on its back it will regain its normal position. But it cannot pick up food for

* "Riddle of the Universe" P 37.

itself, it cannot avoid danger,—indeed it does not recognize danger,—it cannot fly. These powers depended on the co-ordinate action of its higher brain cells, and the removal of these cells reduces its activities to the condition of a lower order from which it sprang.

No one has been able to carry on similar experiments with the higher mammals, because of the resulting shock and the uncontrollable hemorrhage; and of course experiments on human beings are out of the question. But there is good reason to believe that if these normal and technical difficulties could be eliminated, the trained physiologist could carry a man back by the successive steps of his evolution from lower orders, first, in the scale of civilization, and then in that of organic life, by simply destroying in succession the physical centers of the brain from the highest to the lowest. There are many cases in medical literature of insanity resulting from injury to the brain, and disappearing when the injury was cured. In some of these cases the injured person while retaining nearly complete control of his mental faculties lost all sense of moral accountability and committed grave offenses. Certain diseases, especially paretic dementia, produce the same effect, and these diseases have for their constant lesions the destruction of the brain tissue.

The phenomena of anaesthesia furnish similar evidence. Physically the person going under chloroform or ether loses first conscious sensibility, then unconscious sensibility in the voluntary muscles, then the peristaltic action of the involuntary muscles of the coats of the intestines stops, and finally, if the anaesthetic is pushed, the heart ceases to beat. Mentally the same order is followed,—the reverse order of devel-

opment. The patient loses first his judgment and self-control, his ethical instinctive and carefully taught manners disappear, and he laughs, cries, or swears, in utter abandon, long before he has ceased to be able to repeat, parrot-wise, the monotonous counting of the anaesthetist. The qualities latest acquired, which can best be spared, go first. Judged by this grimly practical test, our mentality depends upon the physical development at the time and must have been an evolution from lower forms of mentality

Paleontology does not disclose the beginnings of life. It reaches back in animal life only to the evolution of organisms with hard bodies.

Darwin says that the evidences from geology are few and scattered, that only a small portion of the earth's crust has been penetrated, and that fossil remains are not so satisfactory as he could wish. But when he was in South America, during the voyage of the *Beagle*, he noticed that the fossil species of that region were only modifications of the living species. Romanes, on the contrary, says that the geological record is very rich in evidence, and in his work entitled "*Darwin and After Darwin*," gives a large number of very convincing proofs. Among them are the following:

"There is a general concordance of fossilized animals, from the Cambrian formation to the Post-Pliocene, with the requirements of the evolutionary theory. There is an evident adaption of the animal to its habitat; a correspondence of its structure with the necessary function of obtaining sustenance in the peculiar conditions of each geological period. There is a gradual progression from the simple to the complex;

from homogeneous structure to specialized or heterogeneous structure.

"The earliest ruminants were hornless. Then in the middle Miocene, the first antelopes appeared with tiny horns, which progressively increased in size until the present day. But it is in the deer tribe that we meet with even better evidence touching the progressive evolution of horns. For deer's horns or antlers are aborescent. Among the older members of the tribe in the lower Miocene there are no horns at all. In the mid-Miocene we meet two-pronged horns. Next, in the upper Miocene, and extending into the Pliocene we meet with three-pronged horns. Then in the Pliocene we find also four-pronged horns, leading us to five-pronged. Lastly, in the forest beds of Norfolk, we meet with arborescent horns. The life history of existing stags furnishes a parallel development, beginning with a single horn (which has not yet been found paleontologically), going on to two prongs, three prongs, four prongs, and afterwards branching" *2

Prof. Marsh's illustration of the evolution of the horse and his progenitors, from the Eocene epoch to the present time, is one of the strongest proofs from Paleontology. In each epoch the feet were structurally adapted to the surface of the earth for locomotion, and the teeth to the mastication of the existing food of the period. But the principal point is that each successive form was a modified descendent of the preceding form, changed by the natural method of variation and heredity, not by special creation. In this case of the horse and his ancestors the missing links are produced by Prof. Marsh. On page 232, Le

*Vol I, pp. 167-168.

Conte's "Evolution," in speaking of the missing links in general, Prof. Le Conte says, in reply to the question. Where are intermediate forms?: "We answer, the intermediate forms are eliminated in the struggle for life and are not reproduced by cross-breeding."

I take it that this disposes of the missing link. I hold that it is absurd to talk of the missing link, for the further reason that the gradations are supposed to be so gradual each modification has been so slight that it could not be perceived by the human senses even if it did exist. Each gradual change from a low type toward a higher animal would be classified by naturalists as either a variety or a new species, and would be the missing link, but unrecognized as such. Were all the variations through which the first form has passed in its development into the species now existing, before the naturalist for classification, the whole might be called one species with innumerable varieties. Agassiz examined several thousand shells of one species and found no two exactly alike. Those species which De Vries claims are formed by one variation would perhaps show the "links" in still less degree, when the actual mutation is not seen in the wild state.

Paleontology can only give evidence of the evolution of species in time. But geographical distribution furnishes arguments from the wide spread location of species in space. If the theory of special creation were true, then there is no reason why forms, either fossil or living, adapted to a given environment, should not be found in all localities furnishing such environment. For example, the rabbit when carried in ships to Australia found itself so well adapted to that locality that it overran the island until it was

declared a nuisance. Other mammals carried to the island thrived as well. Yet the only mammalian life indigenous to Australia,—the dingo being plainly an importation,—is one of the oldest and least developed kinds, the marsupial. The duckbill is a very low form of vertebrates. In Australia the forms of animal life found upon the discovery of the island consisted of those found also fossilized in the Cretaceous rocks. The inference is that in the Cretaceous period Australia was connected with the continent of Asia, and was then or soon thereafter transformed into a large island, but not of sufficient dimensions to make geographical distribution efficient as an element in the evolution of new species from the lower orders of vertebrates then existing. About one-third of the island,—the interior,—is a desert without animal life. If Australia had remained a part of the continent of Asia above as it does below the surface of the ocean, the same mammalian forms would have evolved there as in Asia. The absence of mammals and the persistence of marsupials are thus accounted for by natural cause and effect.* It was while on the voyage of the *Beagle* that Darwin noticed a similar anomaly in the fauna of the Gallapagos Islands, six hundred miles off the west coast of South America. The fauna there consisted almost entirely of birds, with three species of land tortoise and five species of lizard,—no mammals. But he noticed that the forms of these were very closely related to those on the mainland. The inference was that the islands had been colonized by such of the continental forms as could cross the intervening strip of the sea, the birds by flying, the lizard and the tortoise or their eggs transported on drift wood or carried by water direct. But why, if spe-

cial creation were a fact, was there an absence of such forms of the animal kingdom as could not have been brought in some way from the continent? These islands are as well adapted to mammal life as the continent is, and if all mammals were specially created, why not here?

Romanes in his chapter on "Geographical Distribution" says*: "The conclusion to which, I submit, all the evidence leads, is that if the doctrine of special creation is taken to be true, then it must be further taken that the one and only principle which has been consistently followed in the geographical distribution of species, is that of so depositing them as to make it everywhere appear that they were not thus deposited at all, but came into existence where they now occur by way of genetic descent with perpetual migration and correlative modification."

The Method.—So far I have confined my remarks on evolution to the physical facts which seem to support it. But the method is equally interesting, because not until Darwin, did any one draw the same conclusion as to the method from the same well known facts as he did, except Alfred R. Wallace, who published his paper on Natural Selection simultaneously with Darwin's "Origin of Species." But Darwin undoubtedly preceded him in the conception of the theory. For in 1839 Darwin wrote a foreshadowing of it, and was really at that time convinced that natural selection was the principal method. He arrived home from his voyage on the *Beagle* in 1837 and in 1844 he wrote the "Origin of Species" very much as published in 1859.

* "Darwin and After Darwin."

Naturalists prior to Darwin had busied themselves in making collections of specimens and studying the facts of affinity and variation, without seeming to arrive at any theory regarding the origin of forms. They took for granted the statements in Genesis and classified accordingly. Species were asserted to be immutable; each the result of a definite creative act, and each separated from every other by impassable differences. These were the bases of the Linnean classification and also of Cuvier's. The naturalists, St. Hilaire, Lamarck, and Erasmus Darwin were exceptions. They conceived the idea of evolution, founded on methods not properly established by science at that time, and therefore not adopted by naturalists until a more correct method was established by Darwin and Wallace.

Any classification, however, was an analysis made by man, as a means of logical study, and was more or less artificial.⁴ Darwin and Wallace noticed that living animals had a close resemblance, not only to each other, but also to fossil animals of the same region. They experimented by breeding animals under domestication and also noticed that structural variations appeared frequently in the offspring. This led them to speculate and theorize until they both published at the same time the hypothesis of natural selection as the method by which species had been produced. Their speculation, however, was inductive, not metaphysical. It was confined to the realm of natural cause and effect, and therefore scientifically legitimate.

There is a metaphysics of science in the sense that many things, like the nature of the atom, or composition of matter, or of the medium called ether, are speculative. But these are simply assumptions of the

unknown probabilities of matter and motion, based on known phenomena. There is a very important distinction between natural and supernatural metaphysics. An extreme and the newest form of natural metaphysics is a statement by Lodge on page 383 of the August number, 1904, of Harper's Magazine: "What electricity itself is we do not know, but it may perhaps be a form of or aspect of matter. Now we can go one step further and say matter is composed of electricity and of nothing else." This use of natural metaphysics is within the probable bounds of knowledge. I presume this is the speculative sense, in which any scientist would use it. But metaphysics, in the ordinary meaning of that term, is confined to speculations in the realm of the "Unknowable absolute."

Darwin was impressed with the theory of Malthus. This is, that human life increases in geometric ratio, while the means of subsistence multiply only in an arithmetical ratio.⁵ The theory will apply more fitly to wild animals than to man, because they have no way of artificially increasing their food supply and adopt no methods of their own to restrict reproduction. As numbers increase there arises a struggle for existence, and that this struggle results in favor of those organisms best fitted to spread out over more territory and adapt themselves to new sources of sustenance, and to new conditions of life, is undoubtedly a fact. If animal life continually increased and no deaths occurred it would, in a comparatively short time, fill the whole earth and devour all the means of subsistence. This would destroy all animal life. But only the best fitted have survived, the less fit have been overcome. The result has been a constant

progress from the weak to the strong, from the simple to the complex, from the comparatively homogeneous to the heterogeneous. The principle can be illustrated by the gradations of nerve structure in the organisms, from the nerveless protozoa to the brain of man. The latter is complex in his mental as well as in his physical structure, and therefore has almost infinitely wider relationship with his environment than the former. He is therefore the better fitted to survive under any and all conditions, while the trilobite, for instance, could survive only under one condition and that a very lowly environment from the Cambrian to the last of the Carboniferous periods. This holds good with all grades of animal life, in proportion to the complexity of the nerve structure.

In chapter 4 of the "Principles of Biology," Spencer treats of the proximate definition of life, and shows that it means the same as his definition of evolution given heretofore. So that the title, "From Homogeneity to Heterogeneity," means the evolving of the higher forms of life from the lower. The term "Higher Form" means a more heterogeneous structure and function. The "Moner" of Haeckel is the lowest evidence of life that we read about, it being a splotch of organic matter without form and having no cell formation. The matter of the "Moner" is as nearly homogeneous as any organic matter can be. From this first life substance, or protoplasm, it is reasonable to infer that the cell was slowly evolved, which probably has taken more time, as geology marks time, than all the ages since the first cell was formed. Montgomery, in "Analysis of Racial Descent in Animals," contends that racial advancement is not from the homogeneous to the heterogeneous, but that it is

the degree of morphological departure from the original ancestor. Now it is true the cell is a heterogeneous organ, as he contends, but only in its potential growth energy. But, compared with the heterogeneity of a matured man, both in structure and function, it is quite, though not entirely homogeneous. Evolution in its broadest scope, including inorganic and organic, is certainly a development from the homogeneous to the less homogeneous, if the hypothetical nebula is to be considered homogeneous and as the beginning of evolution. If the atoms were all alike they would constitute a homogeneous nebula.

Darwin made innumerable experiments on domestic animals and plants. Of course he could only set the animal forms around him to doing what nature had always been doing in the perpetuation of wild animals. In domesticity, man, when making a business of producing animals and vegetables for his own use, destroys the undesirable variations and preserves only those useful to him. This made the process of artificial selection operate only more rapidly than occurs in the wild state, and the changes that occurred could be seen by man; while natural selection producing individuals adapted to the environment for their own benefit, away from the vision of man, occupies such long periods and operates so obscurely that man can seldom note its action directly. The object of man's selection was entirely different from the meaning of natural selection. Nature takes her own time, which undoubtedly is very long, in deriving a new species, not for the benefit of man, but for the benefit of the organism selected, and of the race to which it belongs, by the preservation of those best adapted to perpet-

uate the life of the species under the existing natural conditions

Hugo De Vries, of Amsterdam, contends that species are formed by variation and heredity, but that the process is not a slow adaptation of minute variations. He contends that the species is constituted by the required variation from the parent stock almost at once. This Darwin recognized as a sport. Whether this is true or not, it does not invalidate the principle of evolution by the survival of the fittest in the struggle for existence. The theory of De Vries, as I understand it, simply shortens the process of the same essential fact of Darwin's theory

Hugo De Vries says: "Those individuals survive that find their life condition most favorable, and they are therefore the most vigorous. Natural selection in the struggle for existence between the newly originated elementary species is quite different. These originate suddenly, unmediated, and multiply themselves, if nothing stands in the way, because they are for the most part completely, or in a high degree, heritable. If then the increase leads to a struggle for sustenance, the weaker succumb and are rooted out." Alfred M. Girard, professor of zoology at the Sorbonne, Paris, France, in his paper, "Present Tendencies of Morphology," at St. Louis in 1904, says: "A great number of biologists have believed that they found in the splendid studies of De Vries unanswerable arguments against the theory of selection. It is impossible for me to share their opinion. I should say even in examining the question closely, and in penetrating to the bottom of the matter, it is impossible for me to find, in the theory of mutations, any-

thing except a useful complement of the Lamarkian and Darwinian doctrine of continuous variation ”*

The difference between the theory of Darwin and that of De Vries is not that between evolution and special creation Both believe in the mutation of species. De Vries transfers “natural selection” from the evolution of species to the preservation of it. Either theory is in accordance with the thesis of this book. Montgomery says, in “Analysis of Racial Descent in Animals,” page 168, that De Vries grants that mutation may not be the only mode of formation of new species.

Natural selection, then, is the preservation of the favorable individual, hereditary differences and variations. “An individual is said to possess variation when it shows a character not present in its ancestors.” (Montgomery, 1906) Variation shows in from ten to twenty per cent of all organic forms. Variations, neither useful nor injurious, would not be affected by natural selection, but these are frequently perpetuated by heredity. The varieties of species produced by artificial means revert in time to their natural structure when man’s control is withdrawn. It is not likely that artificial selection has been in existence long enough to produce a permanent species that would persist under natural environment when the artificial conditions change to natural ones.

Says Huxley: “In my earliest criticisms of the ‘Origin,’ I ventured to point out that its logical foundation was insecure, so long as experiments in selective breeding had not produced varieties that were

*Page 277, Vol. 5, “Congress of Arts and Sciences.” Houghton, Mifflin & Co.

more or less infertile." He means that the domestic breeds would cross, which seemed to show they were not real species, while real natural species would not. But nevertheless it is a fact that artificial selection in domesticity has produced new forms before unknown without the interposition of special creation under the eye of man.*

Natural selection does not produce variations, nor does it cause heredity, although Weisman adopted a theory that variations are produced by the selective process in the determinants of the germ plasm. But that theory is not generally received. Given heredity and variation, or, as Haeckel calls it, adaptation, then natural selection simply means the continuation of the favorable and the dying out of the unfavorable. Among the lower organisms especially, it is apparent that favorable always means those variations that can easiest procure the means of subsistence, and this is called the survival of the fittest. So that the full definition is "Natural selection is the survival of the fittest in the struggle for existence." It will become evident by careful study that this method is really the only one adapted to build up a strong, enduring, and capable species, or race.

The big-horned sheep is the boldest mountaineer among animals in the Sierras of western America. He possesses many anatomical and physiological features that contribute toward his special adaptation to his habitat. His coat of hair is of such thickness and density that when he lies at night upon a bed of snow the heat of his body makes no impression on his frozen bed. He is, therefore, unconscious of a low temperature. His stomach is adapted to the digestion of mountain verdure. His body, legs, and hoofs

are adapted to climbing or descending steep, rocky cliffs, or jumping great chasms, or leaping from the edges of precipices. The believer in special creation will contend that this animal was created with this kind of a body and coat to enable him to lead his peculiar life in such a region. That is, that his habitat and adapted morphology were predetermined or designed. But the evolutionist says, that the sheep's primitive ancestor was not formed as he is. Neither was the habitat, or the mountain region, at first in the shape it now is, nor was its temperature always arctic nor much different from the contiguous territory. As the mountainous region has been evolved by gradual changes in altitude, by slow uplifts or alternate subsidences, in the earth's crust in its terrestrial adjustment to the constant shrinkage of the heated globe; so the big-horned sheep has been evolved from its primitive ancestor to its present form, by a series of variations in its hereditary anatomy and physiology; and that those variations best adapted to the environment, or habitat, were the ones to survive and perpetuate themselves. The unadapted variations gradually died out as the evolution proceeded. While the environment changed from time to time under the same evolutionary law of constant readjustment to new conditions, due to the condensation of the matter of the sun and earth, yet the environment is the more constant and persistent factor, the animal being the more mobile, and variable, and inconstant factor.

In evolution the environment never adapts itself to the animal, not even to so complex and seemingly powerful an organism as man. The surface of the earth, the temperature, the humidity,

and many other forms of the environment are in constant change. But there is no change of any kind ever taking place with reference to an adjustment of the total environment to the welfare of man, as man himself views his welfare. The wind is not tempered because the shorn lamb needs a higher temperature. For instance, when the glacial epoch had covered the northern hemisphere with ice, all life not adapted to that condition was destroyed, only the arctic flora and fauna could survive. It is always the organism that adjusts its form, its life, its beginning, and its end, to the inorganic environment. In other words, the mutual correspondence between the animal and its environment brings about what we call an evolution in the order of all life forms, by which the necessary forms of present races correspond with the present natural conditions of the earth's surface, and the great differentiation in species now inhabiting the earth is accounted for in a logical manner by descent with modifications. This is the theory of evolution by natural selection in the survival of the fittest in opposition to the former theory of special creation.

There are many authors who write on biology and evolution in a very learned way who discredit natural selection as a method of evolution. For instance, H. Charlton Bastian, in "The Nature and Origin of Living Matter," dwells very learnedly on the mode of appearance of living units from non-living matter, and the innate tendency of living matter to variation. He believes that archebiosis and heterogenesis frequently occur. "Variation" is only another term to express these two modes of bio-genesis. Archebiosis is really spontaneous generation, or the formation of protoplasm from inorganic ele-

ments Heterogenesis is the production of a different form and function from that of its progenitors. Both of them, therefore, can be termed methods of variation "Organic polarity" and "mutation" belong to the same category They are theoretical causes of variation and simply express an unknown process of change by either continuous or discontinuous growth It is so with "seasonal dimorphism." There are three other factors of evolution mentioned by Bastian, viz, "sexual selection," the "effects of use and non-use," and "the direct influence of external conditions." These are all causes of variation and when variation and heredity are combined in one process the continuation or perpetuity of the varied forms depends wholly on adaptability or natural selection. The latter is simply the process of weeding out the unfit, and, of course, the result is the survival of the fit, or the adapted Therefore, natural selection is not a cause of variation It makes no difference whether the cause of any given variation has operated through the soma or by way of the determinants of Weissmann, natural selection only begins where all the causes of variation leave off For instance, if sexual selection produce a variation from either or both parents which is beneficial to its possessor in the struggle for existence and that variation proves hereditary, then its continuance is a selective process. Or if a variation arise by use or non-use of some of the bones, muscles or internal organs of an animal, and that variation becomes hereditary, then its continuance is a selective process and the individuals of the same species who have not the same or an equally efficacious variation will naturally die out by the increase of the ones who inherit the valuable varia-

tion. Darwin did not claim that natural selection was a cause of variation. Now if by the mutation theory of De Vries, any one or more of these causes of variation produces suddenly a sufficient variation to establish *per saltum* a new species, its perpetuation will depend upon its adaptation to its environment and this is the process of natural selection. It is probable that some species are suddenly formed by one jump. But is it not more probable that Darwin is correct that most species in the natural state have been formed by the survival of slow and minute hereditary variations upon which the principle of natural selection could operate? Thus the method of natural selection is the most important, if not the only method, by which the great variety of species now occupying the land and water have come about. Of course, variations, whether inherent or brought about by external causes and heredity, are essential factors with natural selection in the evolution of new species.

But the causes of variation must not be identified with natural selection. The latter follow the former and simply determine what shall survive and what shall die. If the species is formed at once by mutation, it may have been the result of some combination of conditions, both internal and external, that is not of sufficient permanence in time and space both to insure its long survival. Natural selection then annihilates it as soon as the conditions of its origin are modified. It seems plausible that sudden "sports" or jumps of this kind are apt to be ephemeral. But a species that has developed gradually has had time to be tested in a sufficiently widespread variability of climate, soil, in abundant or scant sustentation, in calm and storm, to be pretty certain of permanence.

Persistency of types being so well adapted to every change in the environment have no variation because none of the supposed causes of variation, inherent tendency, polarity, mutation, sexual selection, use or non-use and the more potent of all external conditions, which means simply environment, are all powerless to effect any change of form. But natural selection operates here as elsewhere in keeping a form so well adapted, in the adapted form, without the necessity of variation. In other words, natural selection is the principle of adaptation and is equally efficient in sudden or slow and minute variations, or, in the case of persistent types, no variations at all. Neither is it confined to the evolution of new forms in biology. When the atoms of the nebula from which the solar system was evolved selected the proper direction of movement, which finally resulted in the condensation of all the atoms into the present forms of the solar system, that was a process of natural selection which has characterized that and all other atoms in every combination they have since made, whether into molecules, ids, physiological units, ions, biogens, or electric discharges. It seems to me that nature itself is a selective process, by which integration and dissipation are, for the time being, always adapted in every locality and in every phase of them to the requirement of the universe as a whole.

While the principle is quite apparent in the physical life of animals and man, it is more difficult to perceive it in the psychical life of man. With man there is a higher degree of mentality, which must be considered as a function of the physical. This gives him a much wider and more complex environment, with which he is in correspondence. The higher the men-

tality, with reference of course to the maintenance of a higher adaptation to the material environment, the more readily will natural selection operate in its perpetuation. It is a mentality based upon its emanation from, and generic connection with, a material environment. But if that higher mentality is what is termed merely a sentimental one, impractical, artificial, and in correspondence only with the fantastic and immaterial environment, it would be unfit for the preservation of physical life, and therefore of its own life. Man is so heterogeneous, especially in his mental functions and social relations, that the action of the principle is much less easy to trace. Yet, the more the principle is studied, the stronger becomes the evidence that natural selection is operating just as powerfully in man and in all aggregations of men, in society, in governments, in churches, in barbarism, or in civilization, as in any animal organism. I can see no reason why the principle should not be the essential method through all phases of organic life. It is true that man seems to have a larger degree of control of his functions than do the lower animals. Consciousness and reflection, in the form of so-called memory, reason, and will, seem to partially supersede natural selection. But in my opinion this is only apparent, and certainly not efficient, to prevent the natural survival of the fittest in all organisms and methods; not such as man himself would select as the fittest, but what the persistence of force may determine, by actual test, to be so.

It is frequently asserted that psychological, sociological, and ethical evolution has been superseded and arrested by the evolution of reason. One writer on psychology makes this assertion "Consciousness is

not a mere succession of ideas; it is a self, conscious of itself, of other selves, and of its own ideas." This is the same old conception of a soul entity in a new definition. There being no hereditary connection between such consciousness and the body, the biological laws of evolution of the latter would not apply to the former. In this view of consciousness, as a self, the factor of heredity is ruled out. While it is forced to recognize psychic likenesses, between parent and child, yet these are called "empirical observations of likenesses." Now these likenesses are, of course, the result of hereditary nerve structure, which, under similar conditions, produce the psychic likenesses. This view brings them within the law of biological evolution.

Prof Ritchie, in "Darwin and Hegel," in the chapter devoted to Plato's *Phaedo*, says: "Self-conscious subject is a higher and better conception for soul; and if the soul is called a substance, it can only be this that is meant." A psychologist can mean only this when he says that consciousness is a self, conscious of itself. Reason as defined by such writers means the power of the organism to control its own development and its own functions. It means further, according to these, the ability to organize mankind socially and morally, and in that way to arrest the principle of natural selection and introduce design where none existed before. This seems to be viewing reason as a creative entity. But the fact is, reason is nothing more than one phase of the psychical aspect of the physiology of the brain, and can only be a result of physical molecular motion in certain centers of the brain tissue, and this is the product of biological evolution. There is a social evolution which, of course,

is accomplished through the psychical power of man. But as man's psychical power comes only through a natural adaptation, or adjustment to environment, the resulting social evolution, while seemingly under the control of man's "free-will," is determined by the laws of physics—that hold man's "will" within the bounds of economical adjustment. All reason is determined the same way.

Alfred Binet says, "Reason is a synthesis of images," and that describes it to me very accurately. It is sense impression, arrested, perhaps, by not having the ordinary and oft repeated channels of movement which the emotions have, i. e., not being reflex, being a later evolved structure than that which produces emotion or instinct. The conscious psychical effect of this arrested reflex is called memory, reason, or imagination, according to the particular center of the cerebrum excited; and the final manifestation of the energy thus aroused, in nervous activity resulting in muscular movement, is called will. The anatomical fact that, in some way unknown, a variation occasionally occurs in the way of added convolution of gray matter, or facility of molecular motion in the cortex of the brain, gives the organism so favored new power in co-ordinating sense impressions. The human brain has evolved by reason of these biological variations and not by its own "will." The real difference between two brains, whose anatomy is apparently alike is very obscure. Why the cognitive centers will develop so much more readily, and become so much more powerful, in one than in another, with an equal environment and practice is an unsolved problem. The difference in function does not seem to depend entirely upon the weight and size of the organs. It

is rather a difference in mobility, or at least the quality of the gray matter, or the perfection of the cross association system, in its adaptation to the all important function of co-ordination and inhibition. The greater activity of the one brain, in producing that psychic effect popularly called "will" impresses the observer as being the result of the will reacting, as a governing power, over the molecular motions and thus molding it by "will power." But this is only apparent, not real. All the psychic phenomena, beginning with the simple emotions, which perhaps at a very early period of the evolution of mind, were as difficult to express as is now the highest thought, or reasoning in man, have been evolved by reason of those variations or differentiations. It is also likely, that when man's present memory, reason, and will, shall have been in use a sufficient time, they will become as automatic as are now the emotions and instincts. Then the new-born infant will have them as he now has fear, love, and hatred. Then higher, more abtruse, more complex psychic phenomena will gradually appear in the mature human organism.

"Civilized man enjoys an advantage over savage man, far in advance even of those which arise from a settled state of society, incentives to an intellectual training, and so on. The inestimable advantage consists in the art of writing, and the consequent transmission of the effects of culture, from generation to generation. Quite apart from any question, as of hereditary transmission of acquired character, we see in this intellectual transmission of acquired experience, a means of accumulative cultivation, quite beyond our power to estimate. For unlike all other cases where we recognize the great influence of individual use or

practice in augmenting congenital "faculties" (such as in the athletes, pianists, etc), in this case the effects of special cultivation do not end with the individual life, but are carried on and on through successive generations *ad infinitum*. Hence a cultivated man inherits mentally, if not physically, the effects of culture for ages past, and this in whatever direction he may choose to profit therefrom. Moreover,—and I deem this an immensely important addition,—in this unique department of purely intellectual transmission, a kind of non-physical natural selection is perpetually engaged in producing the best results. For here a struggle for existence is constantly taking place among ideas, methods, and so forth, in what may be termed a psychological environment. The less fit are superseded by the more fit, and this not only in the mind of the individual, but through language and literature, still more in the mind of the race. "A Newton, a Laplace, a Gauss, or a Cayley" would all alike, have been impossible, but for a previously prolonged course of mental evolution, due to the selection principle operating in the region of mathematics, by means of continuous survivals of the best products in successive generations. And, of course, the same remark applies to art, in all its branches."*

Montgomery, in closing his very interesting chapter on "Environmental Modes of Existence," says, page 41: "* * * There is a transmutation of habits, quite as much as of structure, and the former is probably initiative of the latter."

There is no doubt in my mind, but that this arrested molecular motion, or reason, as it has always been

* "Darwinism of Darwin" Romanes.

metaphysically defined, which gives us the feeling of choice, or design subjectively, simply follows, in its ultimate course, the line of least resistance. In doing this, it produces a feeling of satisfaction, or more accurately it directs the tropisms, or physical tendencies of the organism which results in what is called reason, just as the faint reproductions of former sensations, called memory, are produced by a molecular movement closely allied to that which originally produced the sensation recalled. The line of least resistance to a sensation coming to the brain is the product of a great variety of incident phases of the persistence of force, coming from the objective environment.

The question of line of least resistance, as well as the attraction of gravitation, is, at large, the question of the general diffusion of matter, while the method or process of such diffusion is that of the nature of motion. Matter perhaps was never wholly quiescent. In that condition of it in the nebula when it was most homogeneous, we assume its natural tendency to condense, and the theory of evolution requires, that since then it has been in perpetual process of integration and dissipation. This means that "substance," a term applied indiscriminately to matter in all forms, is a combination of matter and motion. It is in constant change, and when we say that it always follows the line of least resistance, we mean that it is moving from a location where it is to another where it is not, and that this results in what is termed equilibration. But, in fact, there is no equilibrium, except in the homogeneity of a nebula, where all the particles in theory are equally distributed, and of this we have no conception. The line of least resistance in the psychical device of man is the tendency of "mind" always to

maintain the life of the organism and perpetuate it by heredity. Otherwise its correspondence with objective environment would soon be severed and all life would soon end.

The process called reason is modified very largely by the simple emotions of fear, anger, the affections, the sexual emotion, and sense of possession; and by the multitudinous combinations of these in complex and secondary emotions. The common necessity of sustentation of the body and defense of life nearly always determines the final channels of sensations or feelings. Sustentation is transfer of substance from where it is to where it is not and a change during the process to a new form; and fear, or defense of life, is the change of the line of motion of substance from where there is resistance to a line where there is little. In all cases, the final decision of so-called reason, i. e., the course the molecular process producing the mental hesitation will take, depends upon some motive outside of the so-called mind itself, operating through the emotions or instincts, generally through love or fear. For example, when a man unexpectedly confronts danger to his person or to his family the direction of his motor action or "will power" is entirely governed by the emotion of fear suddenly aroused. He meets it by doing that which his judgment dictates as the most effective for avoiding the danger. It is the preservation of himself or his race that produces the reason and the "will," or, as said above, the transfer of motor actions from the line of resistance to one of lesser resistance. Thus, in reality, what is called the mind of the organism, which is nothing but the aggregation of natural feelings induced by molecular or chemical motion, initiated by objectivity, has

no control whatever in forcing this molecular power of the brain into any but natural channels, and only into such channels as make for the physical welfare of the individual and his race.

Any departure from this principle simply ends in calamity to the individual. The world is strewn with the wrecks of lives because the reason of man has often become insane upon this proposition. Nations and civilizations have failed because their measures have departed from the natural and physical welfare of man and society into the realm of fantasy and imagination. The French kings, who, by their acts, brought on the Revolution, and George III, who lost to England her most valuable colonial possession in America, are vivid examples of brains that ignored the law of natural cause and effect. It is so with every individual who ignores the physiology of his body by living intemperately, or who does any act inimical to his health or morals. There are certain channels in which reason must operate if it is to be effective. Disaster comes sooner or later if it neglect these for others not regulated by the law of fitness, viz., the survival of the fittest. Said James A. Froude, in his lecture on "Science of History," in speaking of the philosophy of Buckle: "Men have gone on for centuries trying to regulate trade on moral principles. They would fix wages according to some imaginary rule of fairness; they would fix prices by what they consider things ought to cost; they encouraged one trade or discouraged another for moral reasons. They might as well have tried to work a steam-engine on moral reasons. The great statesmen whose names are connected with these enterprises might have as well legislated that water should run up hill."

In my judgment, the former so-called faculties of reason, memory, will, or any function by which, according to the ideas heretofore prevailing, man seems to choose for himself how his brain or any of his so-called faculties may act, are without any foundation when investigated scientifically. They are conditions produced by objective sensations coming to the brain. The results are produced by these objective influences in the aggregate and are done so gently and unconsciously as to seem to the organism a matter of personal choice or power within himself. The facts of human existence in its utter dependence on its constant adjustment to objective environment for its continuance are proofs of this proposition. The conditions greatly differ in different brains; hence, the difference in the so-called reasoning power, will power, etc. That is, the reason is always determined by the individual nervous structure in its manner of responding to objective influences. If this view, that psychical phenomena are produced by objective energy acting upon structure in the brain tissue, producing function, is correct in theory, then it is evident that they are governed by the same law of natural selection that governs all other phenomena; that is, the adaptation of the organism to the environment. The evolution of the gens, the phratry, the family, the tribe, and the state has occurred by the same method as the evolution of the individual, viz, by natural selection and the survival of the fittest. The existence of each aggregate was necessarily adapted to the physical necessities at the time; and whatever laws or customs grew out of the conditions were at the time and under all the circumstances those conducive to the real happiness and welfare of the social organization. Otherwise the

social organism could not survive. A study of them shows that, in all instances, the matter of sustentation and its necessary mode of production of food and shelter were the ruling factors in compelling the individuals of each social community in determining the form of government and the morals of its members. The form of marriage called the group, or afterwards the pairing, in which the lineage was traced through the mother, and during which the little property was owned in common in the gens or tribe, as existed among the American Indians, was universal throughout the world at the same stage of what is called savagery, or in the lower forms of barbarism. It was as true of the Greeks, Romans, or Germans in the same stage of evolution as it was with the Celt and the Indian. Monogamy became a custom only when private property came to be recognized and protected; and the monogamous family heralded our present form of civilization, in which the lineage is traced through the father, because he is the producer of commodities and the holder of the wealth. These changes necessitated new forms of the society or community governed by new laws. This relegated woman to the inferior position of a domestic care-taker, whereas, in barbarism and savagery, she was the real head of the gens or kin. The evolution of society at every step was not controlled by sentiment or idealism, but by purely materialistic conditions; or, in other words, by economics, and this was always determined solely by the principle of natural selection, the adaptation of the fittest to the physical welfare of the social unit.

Captain Fitz-Roy, of the good ship *Beagle*, carrying Prof. Darwin around the world, brought also from England a young Fuegian who had been taken to

that country two years before. This boy was returning to his people in the territory adjoining Magellan's Straits at the south end of South America. He was dressed in civilized costume and took with him several articles of English manufacture. He was left on shore as the vessel passed through the Straits toward the Pacific Ocean. When the ship returned some time later the Captain landed and hunted up the boy. The first day he did not find him. But the next morning "a canoe," says Darwin, "with a little flag flying, was seen approaching, with one of the men in it washing the paint off his face. This man was poor Jimmy,—now a thin, haggard savage with long, disordered hair and naked, except a bit of blanket around his waist. * * * We had left him plump, fat, clean, and well dressed; I never saw so complete and grievous a change." (It was grievous to Darwin but not to Jimmy.) * * * "He told us he had enough to eat, that he was not cold, that his relations were very good people, and that he did not wish to go back to England." Darwin goes on to say, "I do not doubt now that he will be as happy as, perhaps happier than, if he had never left his own country. Every one must sincerely hope that Captain Fitz-Roy's noble hope may be fulfilled of being rewarded for the many generous sacrifices which he made for these Fuegians, by some shipwrecked sailor being protected by the descendants of Jemmy Button and his tribe."(*)

The Chief of the tribe and its customs in thus compelling "Jemmy" to revert to barbarism seem cruel to the civilized man only. But not to "Jemmy," who had experienced both. The "reasoning" of the tribe

(*) "Naturalist's Voyage Around the World," pp 228-229

necessarily took that line and form which meant the preservation of the tribe's necessary correspondence with its wild and savage natural environment commensurate with the limited intelligence of the individuals; while the sympathy of the civilians on board the "Beagle" took also that line and form which would preserve the correspondence of "Jemmy" with English civilization, or environment, and therefore was unfit in the environment upon which "Jemmy" was then entering. It is evident that "Jemmy" was wise in remaining with his race. It is the same with the American Indian. When one is taken away from his tribe and educated, then returned, he doffs the civilian's clothes and assumes the blanket. The perfect equality of the individuals making up the communities in savagery or barbarism makes the possession of clothes or anything else not common to the tribe an impossibility. This law keeps the peace, subdues passions, hatreds, mean ambitions, and prevents strife and war. The right of private property, characteristic of our civilization, has brought with it the crimes peculiar to it. Whether we could have the evident advantages of the one without the other is doubtful. Commiseration for the conditions in savagery is wasted, because such conditions are perfectly compatible with its mental and physical development, and perhaps contain as few proportionate necessary evils, as does our civilization. The freedom and equality of savage tribes have never been maintained, when the brain development advanced such tribes to a civilized condition. Tribal governments are almost pure democracies. So that "Jemmy," by rejoining his tribe became an equal with his associates, socially and politically. It is not necessary to mention what his social and political

status would have been had he chosen to remain in England

There was no slavery in the clans, gentes, or tribes of the Indians, nor of any people at that stage of their evolution, because production was enjoyed in common, and was not a commodity. As soon as private property came to be protected, commercialism and slavery arose. These needed stronger protection, than the tribe could, or would give them. Hence the state was formed with police power, and militarism, under which the exploitation of the weak by the strong was legalized. But, when this immense and significant change came about, the numbers of the people had so largely increased as to outgrow the possibility of the gentile, and tribal powers and customs. These needed that each member of a tribe should be personally known to every other member. We are, therefore, compelled to assume that the state which was evolved from these natural conditions,—our own civilization,—was that form of society best adapted to the material conditions out of which they so evidently grew. It is, surely, not an ideal civilization, nor such as the sentiment, nor the reason of men, in the aggregate, could they control it, would select, or make, and the present form of society will not endure. Society is in constant process of transformation, caused by material, not sentimental motives beyond the real control of men. I assume, therefore, that reason has had little to do with it, except to follow the impulses given it, by material conditions. It was an evolution through, not by, psychical processes called ideas, and the ideas were formed by sensations from the objective environment.

“Thus in the light of history, no nation is, as a matter of fact, ultimately irresponsible to the future and

to other nations. If it is responsible, what, then, is the sanction? It is the penalty of death—the penalty of perishing by internal dissensions, or by foreign conquest. “Natural selection” determines in the last resort which nations shall survive, what groupings of mankind are most vigorous, and what organizations are most successful” Prof. Ritchie, “Hegel and Darwin,” page 264 “The realities of the outer world impress themselves upon the brain of man, reflect themselves there, as feelings, thoughts, impulses, volitions, in short, as ideal tendencies, and in this form become ideal forces.”—Frederick Engels What else is it, therefore, but a physical, or biological, evolution?

Man then, as a social and reasoning organism, is still evolving both biologically, and psychologically. He can never hope to free himself from the biological laws of natural selection now, nor at any future period of his evolution⁸

It is assumed by some authors, that what we call the operations of the mind, are not produced by the natural physiology of the brain; but are produced, in the brain, through its structure, and parallel with its physiological operations, by some unknown super-organic, or supernatural power, not natural energy, that has never yet been defined, superior to the primal element,—matter, or energy. The older Cartesian idea is, that the mind is a spiritual entity, having power within itself to freely control the force of energy of nature, working through the brain structure in producing thought.

These parallelists acknowledge the most unaccountable, or not understood phenomena in objective environment, as the natural product of matter and motion. Yet when it comes to accounting for, what are called

psychical phenomena, they refuse to acknowledge that they are the results of the natural interrelation of objective forces and the brain tissue, because this is materialism. It seems to me absurd that natural forces should be so stigmatized, as incapable of producing psychical phenomena, when they are the only agents of the phenomena visible. Possibly the difference in the brain structure of observers will account for this.

I think when evolution, as conceived by Darwin, is fully comprehended by the mass of mankind, it will be seen that all phenomena, physical, or psychical, are the natural results of evolution and its processes. They are the products of that interchange of matter and motion going on everywhere, by a process of integration, and dissipation in some cases so exceedingly slow that man can never perceive either the beginning, or the end of any single phase of it.

My theory is, that there cannot be two separate independent forces operating in the realm of what is called nature,—the one called natural, and therefore evolutionary; and the other spiritual, and not subject to the laws of evolution, nor the result of it. All phenomena usually called spiritual, or psychical, are one in natural cause, with other interchanges of matter and motion, and matter and motion are one in reality,—the unity of phenomena having the dual aspect only of structure and function. Psychical phenomena cease when that interchange of matter and motion ceases. They exist only in connection with nerve molecular motion. Each brain produces its peculiar manifestations for that brain only. These peculiar manifestations, or functions are not produced elsewhere, nor continued, after the disintegration of the brain, unless

by an equivalent quantity, and quality, of living brain tissue, so far as I can observe; and I have seen no evidence, that any other person has observed such a phenomenon.

Spencer's definition of an idea is: "A wave of molecular motion diffused through them" ("an involved set of nervous plexuses"), "will produce as its psychical correlative, the components of the conception in due order, and degree. The idea lasts, while the waves of molecular motion last, ceasing when they cease; but that which remains is the set of plexuses." This means that the nervous structure in the brain, which has been evolved biologically, is the permanent determinant of ideas. Therefore the laws of evolution apply to psychical as well as to physical phenomena.

Every so-called action of the will, and every psychical action, e. g., every thought, is determined either by the preservation of self, or of the race.

This is the meaning of life. It is an adjustment of the organism to the source of its preservation, viz., its physical environment. Therefore, the law of evolution in physical biology, which is the preservation of the individual and the race, must apply equally to all forms of psychical phenomena. Ethics and esthetics, both of which properly interpreted are the harmonization of the ego to a higher and more perfect environment, have been developed in the same way. They come only with increasing heterogeneity of brain; and that has undoubtedly been brought about by the simple principle of natural selection, the survival of that type of brain which gave ability to adapt one's organism to higher and larger environment. We must not lose sight, in the study of this principle, of the fact that neural variations are very obscure, and that

natural selection acts on them for the benefit of the race, and not always to the apparent advantage of the individual.

This division of the human organism into a duality, physical and psychical, and the treatment of the psychical, in the last few pages, as the product of evolution, is necessary only in view of the commonly accepted theory that the psychical is a distinct entity. But it is entirely unnecessary to the monist, who holds that the organism is a psycho-physical unit, the psychic being a function of the physical. The monist holds, that the proof of the evolution of the body carries with it the evolution of all the manifestations of its structure, "soul" being one of these manifestations,—a late acquired one, which is better defined as the phenomena of ethics

We know from our own observations, upon which we base human law, that whatever seems wisest and best in social custom, even to ourselves, eventually survives; and whatever is wisest, and best humanly speaking, should be the fittest. But remember at the same time that our human ideas of the best and the fittest are not always the same as the wide reaching methods of cosmic forces. As one instance, of the operation of natural selection in the survival of the best in human institutions; but beyond the control of human design, except as that design may be shown in repeated experiment, take the illustration of the celebrated lawyer, who, in commenting on the evolution of the common law of England, in its wonderful adaptation to the preservation of the interests of man in his governmental relations, with that form of government peculiar to England, said, that if all the criminals who had been condemned, by the law, could be placed

on a lone island in mid-ocean, and left to their own control, they would, as a matter of self-preservation, be compelled to adopt the very code of laws, by which they had been condemned. This might not occur until a large number had been annihilated, through ignorance, by a violation of the natural laws of sociology, and obedience to an unfit criminal code. Then, the common law, being found best fitted to preserve the natural laws, would be necessarily adopted. That is, those who have a variation of brain structure enabling them to keep in harmony with natural and social law survive, and those who do not, die. Man's artificial selection of customs, or habits, must be in conformity with the natural selection of cosmic law. England's common law was strong and sufficing only as it co-ordinated with natural law, and that condition was not evolved until many laws had been tried, and discarded. The common law of England is the result of a thousand years of social evolution, and yet its theory still abides, that every interest rests in a king. These castaways on an island would, of course, not be compelled to choose a king; but, for self-protection, do the reverse. Under penalty of ultimate extinction, otherwise, they would be forced to adopt those laws, viz, customs, that all human experience has shown to be necessary for the support of society. While codes could be adopted that might in very many particulars differ from the common law of England, especially in regard to royalty and state church, and in the penalties attached to crimes and misdemeanors, yet the rights of man and the rights of property would have to be protected in practically the same way, that these were in the laws under which these criminals were condemned. The whole social evolution has

been, as far as man had anything to do with it, trial, failure, and continually a repetition of trial in different forms and directions, never quite solving the final problem. Perfection has not yet been reached, and perhaps never will be.

If all conventional human laws could be erased and men left to protect society by those customs which experience would compel, it would be found that there is a natural law by which alone the social bonds could be preserved. This is the law to which all conventional laws, all written constitutions and statutes must conform under penalty of social and individual extinction for violations. The Stoics first gave distinctive expression to this principle—the conception of an ethical ideal abiding above the will of legislators. Plato undertook to prove that this principle rested on the constitution of man and of human society. Aristotle recognized that there was an ideal standard more fundamental than the written or unwritten law of custom. Thus Greece and Rome gave to mankind a natural ethic which theology could not reach, viz, that natural not supernatural law is the fundamental morality, independent of convention and superior to enactment of kings. This is really the law of evolution in its broadest sense.

Whether the process of organic evolution is accounted for by natural selection, which Darwin defines as the preservation of variations favorable to the individual, in its struggle for existence; or by sexual selection, which contributes to the perpetuation of the race, or by the use or disuse of parts, yet all these processes, elaborately discussed also by Darwin, are natural, as contradistinguished from special creation. It seems to me, also, that they could all be classified under the

head of natural selection, in which case the definition should be enlarged to read the adaptation of individual variations favorable to the organism, in its struggle for existence, and to the propagation of a strong race. Says Mr. Darwin in "The Descent of Man", "Since in such cases the males have acquired their present structure, not from being better fitted to survive in the struggle for existence, but from having gained an advantage over other males, and from having transmitted this advantage to their male offspring alone, sexual selection must have here come into action. * * * But in most cases of this kind it is impossible to distinguish between the effects of natural and sexual selection." If there occur, in the brain of a bird, for instance, a variation of structure making it a lover of the beautiful, as is the case with the Bower bird; while that fact may not seem to us to materially aid that bird in its struggle for mere existence, yet it undoubtedly does so, in the maintenance of the correspondence of its aestheticism, with a similar aesthetic environment.

Certain humming birds decorate their nests with great taste. But the bower-bird in Australia exhibits the most decided love for the beautiful in the construction of its bower. "The satin bower-bird collects gaily colored articles, such as the blue tail feathers of the parrakeets, bleached bone and shells, which it sticks between the twigs or arranges at the entrance. * * * These objects are continually rearranged and carried about by the birds while at play." "Descent of Man," by Darwin, page 41.

The beautiful plumage of some male birds, and the fine forms of larger size, characteristic of males, generally, throughout the animal kingdom, are an aes-

thetic, as well as a physical, contribution to the perpetuation of the strong in biological evolution. The love of the beautiful is shown in all animals, where sexual selection is apparent. This includes mammals, birds, reptiles, fishes, insects, and crustaceans. It is thus shown that the perpetuation of the races is largely influenced by it. Indeed, as sexual selection has been a large factor in the evolution of animal forms, and as the most vigorous and beautiful males are the ones who display the most artistic variation, it follows that the love of the beautiful is biologically connected with the preservation of the individual and the race. The female by accepting the most virile male, as shown by his fine form, gaudy colors and his triumph over his rivals, thus insures the same qualities in their offspring and this produces favorable variations in such offspring, which being inherited from generation to generation, builds up a race of increasing strength. These variations also tend all the time to the slow production of new species.

The same truth follows from the facts of ethics, or altruism. The struggles and the sacrifices made by the males in winning the females are more than equalled in the female care of the offspring. Fatherhood and motherhood in nearly all animal life are full of illustrations of the great principle that all function from the lowest to the highest is based upon the preservation of the individual or the race. In other words, not only is the organic form as a physical unit the result of biological evolution, but thought, reason, memory, aesthetics, ethics, and altruism have the same basis. In the present form of civilized society with the family as a unit, living in homes, the more beautiful and attractive those homes are made, so much

the more are they adapted to prolong the lives of the individuals and perpetuate the race.

The main point is, however, that all these differences are within the realm of natural cause and effect, and the theory does not require the investigator to assume any other cause.

Such are, in very brief outlines, a few of the evidences of the great principle of evolution, and its universal applicability, occurring to the author. Mr. Darwin in his great discovery, as set forth in the most important and most original book published in the nineteenth century,—“*The Origin of Species*,”—discusses the subject elaborately, and to me very convincingly. However, it is well to remark that it is a theory which scientists have generally adopted, not entirely because of its capability of conclusive demonstration, but because it requires less assumption, than any other. It depends upon the manifestations of phenomena only for its verification, and not upon assumptions of either cause, or origin.

Evolutionists do not pretend to account for the origin of matter and motion, nor of life because they have no sensory proof. Neither is it necessary to consider a prior condition to that, with which the senses could have any correspondence.

Such very able scientists as Spencer, Huxley, and Haeckel, however, say that there is very strong scientific evidence that life is an obscure form of that natural interaction of matter and motion, which is constantly going on around us. Haeckel asserts, with positiveness, that while as yet, it is impossible to produce life in the chemical laboratory, except some forms of organic matter which are the excretion of organ-

isms, that is, without cell formation, yet it has been discovered that organic matter is made up of inorganic substances. Says H. Charlton Bastian in "The Nature and Origin of Living Matter—"The inorganic is being continually fashioned into the organic, and this after passing through successive changes, and after having displayed the manifestation of life, is ever passing again into the inorganic" But this assertion that the inorganic is being continually fashioned into the organic must be taken to mean that after the birth of organisms naturally from egg-cells their development is caused by accretion of inorganic matter. It is not clearly demonstrated that organisms arise immediately from inorganic matter.

CHAPTER II

Charles R. Darwin,—the Exponent of Evolution

1. **Personality and Work.**—It is an interesting coincidence, that in writing, in a popular strain, of Charles Robert Darwin, and his genius, Abraham Lincoln's name should come in mind. For he and Darwin were born on the same day,—February 12, 1809; the American in poverty and obscurity, in a primitive cabin in Kentucky; and Darwin in luxury and wealth in Shrewsbury, England. In many physical and mental traits, however, they were very much alike; but principally in having that rare quality, in common, of absolute honesty, permeating their whole organisms, in their three aspects of physical, mental, and moral. One more word, about Lincoln. In any course of lectures delivered by the most prominent platform orators in this nation, nine out of ten, whatever may be their subjects, will have something eulogistic to say of Abraham Lincoln. This is very high evidence of an immortality of character, attained by only a few men.

Darwin was one of the gentlest and most lovable of men. He was unpretending and modest in the extreme. He did not stand particularly high in school, hated the classics, and says he learned nothing valuable, at Cambridge, where he graduated. He was very fond of hunting, and very early developed great taste for making collections of insects, and especially of beetles. Prof. Henslow of Cambridge took a great fancy to him, and when Captain Fitzroy, of Her Maj-

esty's ship "Beagle," wanted Henslow to recommend a naturalist for the contemplated voyage of that ship around the world, via Cape Horn, Henslow recommended Darwin. Darwin's father objected, because, among other reasons, it would spoil him for a clergyman. But he finally gave his consent, and then Captain Fitzroy came near rejecting him, because his nose was not the right shape. Thus between theology, and the shape of his nose, the world came near losing the results of the wonderful scientific observations, and collections, made on that most important expedition.

Going on the voyage of the Beagle did spoil him for a clergyman, but not in the way his father anticipated. It made him instead, a minister of the great biological truths of nature to the coming generations of men. He was then nearly twenty-three years old. He remained on that voyage five years, collecting and working on the innumerable dissections of insects, reptiles, and fishes, birds and mammals, gathered, both on sea and land. His collection, brought home, weighed several tons. Upon his return to England in 1837, he began his life work as a naturalist. From the time in 1832, when he started on the voyage of the Beagle, until he died at the age of 73, he never ceased his labor in this field of investigation. However firmly convinced he afterwards became, in his own mind, of evolution by natural selection, yet he never ceased to gather new facts tending to further confirm it; or if he discovered anything, not in accordance with it, he did not hesitate to make it as public as possible, and discuss its bearing. For instance, as illustrative of his patient industry, in studying Geographical Distribution, he experimented with seeds, and reptile's eggs, by soaking them in salt sea water,

to determine whether they would float, or sink, or lose in any reasonable time the power of fertilization. He thus proved that some eggs and seeds could float from continent to island, and then propagate. He patiently tested them with heat, to see at what temperature their fertility would be destroyed; thus indirectly showing at what stage of the cooling of the earth, life could exist. He scraped the mud from bird's feet, tested it for the seeds, or eggs of insects it might contain, and carefully cultivated it to see what would grow. He tested every conceivable mode of geographical distribution. He went among dog and pigeon fanciers, among the slums, to learn their methods of producing variation, under domestication, and at the same time would write to college professors to make experiments for him. He planted earth worms in the ground at Down, where he lived, and waited for them to make the loam on top of the former level, thick enough to measure. Noting the time, he calculated how many feet they would make in a century. It is no wonder, that few writers on evolution at the present day, can go far without drawing on Darwin for their facts and illustrations. Think of working eight years on barnacles, so small that all the dissections had to be done, under a microscope.

So fond was he of field work, and so absorbed all his life in practical experiments, that he never found time to cultivate the art of composition, and said himself, that he could not express himself well on paper. He was, therefore, frequently misunderstood, even by naturalists.

Darwin, in speaking of the teleology that some men see in the beauty of animals and flowers, says: "If beautiful objects had been created solely for man's

gratification, it ought to be shown that, before man appeared, such objects were less beautiful than now." Then further on he says "Flowers rank among the most beautiful of productions, but they have been rendered conspicuous, in contrast with the green leaves, and in consequence, at the same time beautiful, so that they may be easily observed by insects."

I think this is one of the lapses Darwin frequently falls into. The latter statement presupposes design, and in the language used is strictly teleological. Darwin does not intend it so, but it is opposed to the spirit of natural selection. He meant, the trees or shrubs that from unknown combinations of forces brought forth conspicuous flowers, were the ones visited by insects, who by carrying the pollen to other trees of the same genus, thus perpetuated the genus. The flowers were not created for the purpose of attracting the insects. There was no design. Those trees, whose flowers constituted a favorable variation, attracted the means of fertilization, and were the ones perpetuated. This brings the statement within the meaning of natural selection.

Darwin seems to have unconsciously written at times as if there were special creation, and frequently refers to natural selection, as a positive force that caused variation. His letters written in later life show how he regretted having used language in his publications, tending to convey the idea of design. The sense of beauty in the mind of man, and of the lower animals, is an evolution. The nervous system was evolved in correspondence only with the objective realities in the environment. The senses, therefore, respond to what tends to the physical good of the organism,—this is pleasure; and repel what is bad,—this is

pain What appears beautiful to us, gives pleasure Ugliness is the sense of pain coming through the senses. The colors of the flowers, the optical restfulness of the green of vegetation, were not made to attract, or give pleasure to man, or animal. But man's and animal's eyes were evolved in correspondence to these objective realities, that existed long before animal life,—at least, the chlorophyl of plants existed prior to animal life. Under the head of causes of variation, Darwin says, "Considerations incline me to lay less stress on the direct action of surrounding conditions, than on a tendency to vary, due to causes of which we are quite ignorant."

Natural selection does not apply, until the variations occur, therefore natural selection cannot be a cause of variation. Among the illustrations of the selective principle he refers to two hundred species of beetles, in the island of Madeira, that are so far wingless that they cannot fly. These are preserved by the operation of the principle of natural selection, in that the winds of that island blow those, that rise on the wing, into the sea, and drown them, while those that do not fly survive and propagate When a variation, by non-use, appeared, rendering their wings useless, natural selection perpetuated those having this variation. But it must have taken several generations of beetles to make so radical a change in the structure of the wings by non-use. In any event, I do not see how natural selection can, of itself, be a means of variation in structure. It is true Darwin did not pretend to account for variation in the sense of determining when a useful variation really occurs, nor on what its appearance depends, nor the space of time required for the fulfillment of the selective proc-

ess, but he established the fact that selection must be the process and others, like August Weisman, have been trying to solve the problems of heredity and variation. Numerous writers upon evolution, including even Prof Huxley, minimize the selective theory, but as Weisman remarks, "I am so thoroughly convinced of its indispensability, as to believe, that its demolition would be synonymous with the renunciation of all enquiry concerning the causal relation of vital phenomena." To my mind the real reason why so many scientists neglect, or decry the principle, is the hold in various direct, and indirect ways that theology has upon human thought and mental motives

Darwin says, "Whoever is led to believe that species are mutable, will do good service by conscientiously expressing his convictions; for thus only can the load of prejudice by which this subject is overwhelmed, be removed"—Conclusion of Chapter X, "Origin of Species"

To my mind, the most important discovery of the nineteenth century was the principle of evolution by natural selection in the survival of the fittest. Prior to this century, man was blindly groping after the truths of natural phenomena. As soon as Lamarck, Darwin, and Spencer discovered a natural method, at once the prior mythical theories began to fade away from the minds of scientific men. So, too, did *a priori* conclusions of all metaphysicians, except such as were afterwards proved by induction to be in consonance with the laws of evolution.

Darwin wrote a large number of books that are standards in science. His thoughts were so important to the world, that other writers, by the score,

have been trying ever since the publication of his "Origin of Species" and "Descent of Man," to enlarge, and explain his meaning. I have yet failed, however, to read one of them with so much satisfaction as Darwin, whose somewhat neglected style, is yet so convincing. His works carry upon their face the emblem of sincerity, and transcendent originality

It was the same way, with Robert Burns' poetry. Notwithstanding he wrote in a dialect unknown outside of Scotland, yet the world keeps delving away at it, digging through the homely provincial terminology to get at the precious jewels of truth, hidden therein

At the time of his appointment as naturalist to the Beagle, Henslow wrote Darwin that he was no naturalist, but not to hesitate on that account; that he could make collections and fill the position better than any one else then available. But Huxley says that after Darwin's return from the voyage, his work upon barnacles alone, made him a thorough naturalist. Darwin at times thought that this work was largely thrown away. He also became a geologist, and a botanist, but he was perhaps deeper versed in zoology, than any other branch of science. His work on, "Expression of Emotion in Man and Animals," shows that he knew something of psychology though he did not call it that. He was a naturalist, pure and simple, not looking, nor evidently caring for the origin of life or matter, which he considered beyond our knowledge.

He was a wonderful observer, and always drew from his observations some general principle, that was new and startling. For instance, in his "Fertilization of Plants," he discovered the great principle

that natural selection did not favor close fertilization. Cross fertilization produced more vigorous offspring, and more numerous variations, and these survived under the principle of natural selection, while the products of close fertilization had a tendency, under the same principle, to die out

The mixture of male and female cells, having different numbers of chromosomes, and these of different sizes, and forms, produces a hybrid, which, by thus inheriting the characteristics of both parents, is different from either. But when individuals of the same species, and the same variety, intermix, the chromosomes of the germ cells being alike in number, shape, and size, there is very much less liability of the offspring varying from either parent

Alfred Russell Wallace, whose article on "Evolution by Natural Selection" was read before the Linnean Society in 1858, simultaneously with Darwin's, says in a recent article, "Of late years, and chiefly since Darwin's works were written, the variability of animals and plants in a state of nature has been carefully studied by actual comparison and measurement of scores, hundreds, and even thousands of individuals of many common, that is, abundant, and widely distributed species; and it is found that in almost every case they vary greatly; and what is still more important, that every organ, and every appendage varies independently, and to a large amount. By large variability is meant a variation of from ten to twenty-five per cent on each side of the mean size, this amount of variation occurring in at least five or ten per cent of the whole number of individuals, and in every organ, or part, as yet examined, external, or internal." It is now held by some naturalists that variation is a

natural part of heredity—no two forms being alike in every particular.

Darwin's work on "Earth Worms" raised those obscure, and hitherto unnoticed organisms to the rank of intelligent and exceedingly useful workers. They are makers of productive soil.

In the meantime he had experimented, with great energy and wonderful ability, upon domestic animals, especially pigeons, in producing variations and new species by artificial selection. This was easy. The problem, then presented, was how to prove that Nature did approximately the same things, in producing all the varieties, and species of animals in the wild state. It was, on the voyage of the *Beagle*, that he was first struck with the similarity of paleontological, or fossil forms, with those then living in the same localities. But years passed before he was convinced of the mutability of species, and then, he still refused to see the immense consequences, sure eventually to arise from this discovery. The evidence finally became so overwhelming to his mind, that organic evolution by natural selection, is the process by which living forms have come into their present innumerable shapes, that in 1839, he first wrote a paper upon the subject. The very large collection of specimens, and the wise observations, made on the voyage of the *Beagle*, enabled him, together with his studies subsequently from 1837 to 1858, to write what he calls, the abstract of his work on the "Origin of Species," and publish it in 1859, in practically the same form in which we now have it, although it was added to, and subtracted from, in all the six editions, which he had revised prior to his death on April 19, 1882.

His sense of fairness was so pronounced, that the most of the "Origin of Species" is taken up in discussing the numerous objections that scientists had advanced against the theory. His mind was essentially inductive in its reasoning. His theory was based entirely on facts patent to the senses. He was, in no sense, controversial, nor metaphysical. The mere debating society methods of discussion, he sensibly left to others. Great truths are not determined in that way. Says Jacques Loeb in a paper, read before the Congress of Arts and Sciences at St. Louis, in 1904: "Wherever we can base our conclusions on direct observations, polemics become superfluous."

II. His Theory and Genius.—Although his published works are numerous, his great fame as a man of transcendent genius rests principally upon the "Origin of Species."

His genius consisted of two elements,—first, his great capacity for patient, efficient industry, second, his ability to derive from his observations, and experiments the principle of Natural Selection. Huxley exclaimed when he first read the "Origin of Species," "Why could not I have drawn the same conclusions from the same well known facts?"

Natural selection, or as Hæckel calls it, "adaptation and heredity," or as Spencer most aptly puts it, "the survival of the fittest," means, that when a variation occurs in the form, always followed or accompanied by a variation in the function, which is beneficial to the plant, or animal in its struggle for existence, that form is the one that survives, and propagates itself. As Darwin says, "Only a few of those annually born can live to propagate their kind. What a trifling difference must determine which shall live,

and which shall die." It is this trifling difference, spread over incalculable time, that finally produced all the different species on the globe, from one cell, or something even lower than a cell

It is impossible for man to have any accurate conception of the length of time, as marked by years, or rather as time is estimated, it has taken to evolve the earth and the other planets from the nebula, or even to produce the evolutions of the fauna and flora of the earth, after the globe had sufficiently cooled, after the atmosphere and the water had formed by chemical process. The geologist has marked off the crust of the earth into geological epochs, giving a distinctive name to each period and the probable thickness of the rocks therein and the paleontology of each. But he cannot calculate the duration of any epoch in artificial time with any accuracy. But time being probably simply our consciousness of changes in phenomena, and our artificial division of it into years, months, days, hours, and minutes, merely measures of space, then our conceptions of it are limited to those changes and measurements that are within the reach of our senses. This reach is very limited even when it is so greatly assisted by the recorded experiences of man in the past, and the aid to sight so wonderfully given by the telescope and the microscope. Bearing in mind that the same causes and methods by which these changes were made in the past are still operating to produce still further changes, in the present, and in the future, in consonance with the principle of the persistence of force, we may obtain some faint conception of the immense time they have consumed. The changes that occur in the lifetime of a man are hardly perceptible.

Nor has man been able to detect with any accuracy such as may have occurred in historical time, that is, since man began to record in any way the events of which he was conscious. Yet the forces producing cosmic and terrestrial evolution must be as active now as they ever were. The conclusion is forced on us that man can have no conception of the immeasurable time that elapsed either prior to, or since, his own advent on the face of the globe. The scientist can refer only to the geological epochs and not to time in years

Perhaps the best illustration I can give of what is meant by evolution by natural selection is that all organisms have developed, from lower organisms, in much the same way that every higher organism now develops in embryological growth, from a minute cell to its matured form "The embryo of a higher animal of any group, passes now through stages represented by lower forms, because in the evolution, its ancestors did actually have those forms."*

Darwin's letters for the first few years after the publication of the "Origin," show how agitated he was, and how fearful that his theory would be overwhelmed, or fall flat. But when the first day of its publication, the entire edition of 1,250 copies was sold, and soon after another edition of 3,000, it gave him more confidence. Innumerable adverse reviews appeared immediately, or in 1860-1861.

One favorite way of holding him up to the ridicule of the unscientific, was to asseverate, that Darwin claimed that man was descended from the present race of monkeys I think Prof Le Conte of the Univer-

*"Evolution," Prof Le Conte.

sity of California, has placed the answer to this, in the best light, by saying, "No living form of animal is on its way manward, or can by any possibility develop into man. The parting between the ancestors of man, and those of monkeys, occurred many ages ago. They are all gone out of the way." Also, say the unbelievers, "If species are derived, by slow modifications, and descent, from other species, show us the missing links." Darwin answered, "If you will show me the missing link between greyhound and bulldog, I will." In fact, the missing links are apparent in the mutual affinities of all organisms. The analogy of function, and the homology of the structure, of all vertebrates show their common origin. The wing of a bird, and the hand of a man, are simply modifications of the same structure.

Yet occasionally, a favorable review of the "Origin" was given, and very unexpectedly one in the *London Times*, of two and a half pages. When Darwin read it, he thought he recognized the genius of his friend Huxley, in the scientific bearing of the logic, and at once sat down and wrote him if he could tell him who the author was. Of course, the truth came out, that a copy of the "Origin" had been sent to the regular book reviewer of the *Times*, who could not understand the book, and therefore, could not write about it. In this dilemma, the reviewer applied to a scientist, who happened to be a believer in evolution by natural selection. He recommended him to apply to Huxley, and let him write the review. Then the regular reviewer could write, at the beginning of Huxley's review, a few introductory sentences, and insert it without further addition just as Huxley would write it. This is what was done. It was just what Hux-

ley, as a friend of Darwin's, had been trying to accomplish, viz., to get a favorable notice of the book in the *Times*. Huxley would afterward laughingly tell, that a great many of his friends, after they found that Huxley wrote it, told him that they discovered his authorship from the first introductory sentences, and these he did not write

As a specimen (see page 341, Vol 1, "Life and Letters of Darwin," by his son) of how the unscientific mind was affected by the "Origin of Species," Darwin writes that Lord Stanhope said to him, "To suppose that the Omnipotent God made a world, found it a failure, broke it up, and then made it again, and again broke it up, as the geologists say, is all fiddle-faddle. Describing species of birds, and shells, is all fiddle-faddle." And the common sailors of the Beagle called Darwin a "fly-catcher." In this same letter, in which Darwin writes the above about Lord Stanhope to Lyell, the geologist, he writes some very interesting things. He says, "I work now every day at the Cirripeda (barnacles) for two and a half hours, and so get on a little, but very slowly. I sometimes, after being a whole week employed, and having perhaps described only two species, agree mentally with Lord Stanhope, that it is all 'fiddle-faddle'; however, the other day I got a curious case of an unisexual cirripeda, in which the female had the common cirripedal character, and in two valves of her shell had two little pockets, in each of which she kept a little husband. I do not know of any other case, where a female invariably has two husbands"

III. The Effect on Current Theology.—His life work, although not undertaken with any design to subvert the thoughts of mankind concerning creation,

yet logically and necessarily had that effect. But mankind has always resisted with marvelous and unexplainable fury, any disturbance of their settled supernatural beliefs. It was so, when Copernicus discovered the true motions of the solar bodies; when Newton announced the law of gravitation; and much more so, when Darwin published that animals, including man, were not special creations, but evolutions from lower orders. When one comes to analyze the beliefs of men, it is very singular that men cling so tenaciously to a mere subjective idea, which when tested by the re-agent of objective truth is found to be without any scientific evidence whatever. Lady Macbeth said, "'Tis the eye of childhood that fears a painted devil." While it is possible that Darwin came nearer being open to the truth, as Nature teaches it, than most investigators, yet so strong a hold upon nearly all mankind has the belief in the supernatural, as organized in the different systems of theology, and education, throughout the world, that even he shrank for years after he was intellectually convinced, from making any public announcement of that fact. The virulent attacks made upon him soon after the appearance of his great work, justified that hesitation.

Mr. Darwin himself, tried to maintain as much of theistic ideas, as he thought compatible with a maintenance of his theory. So did Spencer, and almost every scientist. Darwin was compelled finally, after repeatedly being misunderstood and misrepresented, to write as follows, in one of his letters: "But I have long regretted that I truckled to public opinion, and used the Pentateuchal term of creation, by which I really meant, 'appeared, by some wholly unknown process' It is mere rubbish, thinking at present of

the origin of life; one might as well think of the origin of matter.”*

Darwin was not the first one to mention evolution as a fact. But he was the first to ascertain, and prove the process, by inductive reasoning. He established the fact that species are formed in nature, by gradual extinction of the unfavorable, and perpetuation of the favorable variations. The universal belief prior to this was, that species were specially created, by an omnipotent, creative spiritual entity. Three hundred years before Christ, Anaximander, a Greek philosopher, assumed that the earth and like bodies were developed by the rotation of matter, and that the first living bodies were produced by the action of the sun on water. Heraclitos afterwards expressed the same ideas, and so did Empedocles. Democritos conceived an atomic theory and that the soul of man is composed of fine, smooth atoms, similar to those of fire. These Greeks were materialists. But their ideas, being unfortified by the sciences and physics, or chemistry, and there being, at that time, a perfect dearth of empirical knowledge, of course, were very crude in form. This is the reason they failed to produce any permanent effect on the learned world. A mere statement of the theory of evolution is sufficient to show its immense purport, and the astounding and powerful opposition it would receive. It was such a revolution in human thought, which before attributed all creative power to the supernatural, that it took Darwin several years to convince his own mind, and not during his life did he carry the discovery, in any of his public writings, to its full logical sequence, although he did in his private letters.

*Life of Darwin by his son, pp. 202-203

Huxley, and some of the German scientists, in carrying on the work where Darwin left it, show its bearing upon current thought. Especially so does Herbert Spencer in his great work, "The Synthetic Philosophy." Darwin's more intimate personal friends, Prof. Henslow, who was his sponsor as naturalist on the Beagle; Lyell, the great geologist; Hooker, the English, and Asa Gray, the American botanist, bosom friends, while giving him every encouragement in publishing the "Origin," never in their writings went as far in support of the theory, as Darwin himself; and while this fact seemed to hurt Darwin's feelings very much, yet in his letters gently urging them to publicly announce the truth of the ultimate effect of natural selection, he always said to them, that he was not surprised, knowing as he did, what a struggle he had to convince himself. He was not convinced, until the facts became overwhelming under his own investigations of natural organic phenomena. At first Darwin could not give up the idea of design in nature, maintained by Paley in his "Natural Theology," a book that Darwin had closely read with the greatest admiration.¹⁰ But later, Darwin saw clearly how the idea of design, which is the very essence of the creeds of theology, was incompatible with the theory, and so he wrote to Asa Gray, then a professor of Botany in Harvard College, who really wanted to be a Darwinian Evolutionist, but could not give up the idea of design, as follows: "Your question, what would convince me of design, is a poser. If I saw an angel come down to teach us good, and I was convinced from others seeing him that I was not mad, I should believe in design. If I could be convinced thoroughly, that life and mind was" (were) 'in an unknown way, a

function of other imponderable force' (meaning a spiritual, supernatural force) "I should be convinced If man was made of brass, or iron, and in no way connected with any other organism, which had ever lived, I should be convinced. But this is childish writing. I have lately been corresponding with Lyell, who I think adopts your idea of the stream of variation having been led or designed. I have asked him (and he says he will hereafter reflect and answer me) whether he believes, that the shape of the nose was designed" (He might have answered, "Yes, I believe it was so designed, that Captain Fitzroy might reject you as a naturalist on the Beagle.") "If he does," Darwin says, "I have nothing more to say. If not, seeing what fanciers have done, by selecting individual differences in the nasal bones of pigeons, I must think it is illogical to suppose that the variations which natural selection preserves, for the good of any being, are designed"*

Peter Mark Roget. F. R. S., and Fellow of the Royal College of Physicians, in "Animal and Vegetable Physiology," treats, in chapter one, of "Final Causes" On page 21 he says, "If in an unexplored country we saw moving upon the waters of a lake the trunk of a tree carved into the shape of a boat, we should immediately conclude that this form had been given it for the purpose of enabling it to float. If we found it provided with paddles at its sides, we should infer, from our previous knowledge of the effects of such instruments, that they were intended to give motion to this boat, and we should not hesitate to conclude that the whole was the work of human hands and the product of human intelligence and design.

*Life and Letters, by his son, pp 169-170

* * * Let us suppose that in another part of the lake we found an insect shaped like the boat and moving through the water by successive impulses given to that medium by the action of levers extending from its sides, and shaped like paddles, having the same kind of movement and producing the same effects. Could we resist the persuasion that the Artificer" (capital A printed in the book) "of this insect, when forming it of this shape, and providing it with these paddles, had the same mechanical objects in view?" Note the assumption without any proof that there is an Artificer of the insect. What do the human senses testify in these two illustrations? First, that the dug out log was made by human hands and was designed for a boat. Second, that the insect came into existence, just as all other organisms have come, by an egg laid by another insect, similar to the one described, which developed by a natural growth into the boat-like form. It was not manufactured in the same way the dug-out was, in any respect. It is very much more probable that it was an evolution from some other form, just as was also the maker of the dug-out. These are the facts apparent to the human senses, and no one, conversant with the laws of biology and mechanics, can logically aver any other important sensuous facts. Had any one ever seen a personality, or Artificer, with a capital A, design and build the water beetle, the insect referred to, in the same way that thousands of eyes have seen the human designer and boat builder build a boat, then the parallel would be true, but every one knows that such evidence is entirely wanting as to the origin of the insect. What may be the cause of the evolution of the insect is beyond the reach of the human senses.

But some one will say, "There is no effect without its cause" Yes, as far as we can reason, that is so And if there is a personal architect of the universe, then the cause of his existence must be looked for, by the same reasoning. "Yes," will say the theologian, "but we must stop somewhere for a final cause." "No," say I, "the only logical place to stop is where our sense organs fail to penetrate." All beyond is the Unknowable, about which it is a loss of time and energy to conjecture. But let us not delude ourselves with such illogical comparisons as that a final cause can be proved by a supposed analogy between the works of man and the evolution of organisms.

The surface of the earth is changing from hour to hour, and all forms organic and inorganic are constantly undergoing change. Is it to be supposed that these hourly changes throughout all nature are as constantly being manipulated and designed by a personality? The real welfare of man does not require the illogical, and the unsolvable. If design in Nature is a necessary, or desirable fact to establish, it must be universally applicable What is called "evil," as well as "good," must be designed. The sufferings and failings throughout animal life can hardly be thought by the theologian as desirable design, to attribute to his "Author of our being," and thus "obtaining adequate ideas of the power, the wisdom, and the goodness of God" (The quotations are from Roget.)

The earth, its air and water, its flora and fauna, are part of the results of the orderly evolution of matter and motion begun in the nebula. We must conclude that no other result could have followed from the evo-

lution of the matter of which these things are composed, and that a competent intelligence, had such been in existence at the beginning of the movement, could have foretold such a result. If this is so, then chance did not control it, for that means that any other result was as likely to occur. The natural law of cause and effect is incompatible with chance. Nor is it possible that there is design in "natural selection," which means a constant readjustment of all forms by natural force to each other and their environment; frequently a million forms coming into existence before one is perpetuated¹¹

Of course, it was natural that many kind hearts, who saw the force of Darwin's facts, connected logically by his transparent, and convincing reason, wrote him innumerable letters asking him, in various different ways, yet all leading to the same all-pressing question, whether he meant to do away, in mental thought, with the universal belief, in the omnipotent Creator. His answers uniformly gave the writers some consolation. He had a horror of hurting the feelings of any one.

The theory of evolution necessitates a natural cause for every effect. The idea of a creator is a late growth in man. "The idea of a universal and beneficent creator does not seem to arise in the mind of man until he has been elevated by long continued culture." Darwin's "Descent of Man," page 627. He means theological culture. Among the Rock Veddahs of Ceylon, Hobhouse says, "There is no evidence of any conception of a creative God." This is a very primitive people, yet "They are truthful, unaggressive, hospitable and sympathetic to strangers in need, grateful, and plucky in fighting." Primitive men have no

idea of a god. Stanley found this so in Central Africa. The Eskimo, to whom no missionaries have ever been sent, have no such idea. The country is not attractive to missionaries. But those savage, or primitive communities to whom missionaries have taught the idea, have it vaguely, and this fact has given some color to the assertion, by the adherents of the Church, that the idea of god is innate in the human mind. Such persons did not require much evidence to assert what was so essential to their theory. When Moses received the Decalogue the Israelites were worshipping several gods. When he came down from the mountain they had set up other idols. So the first commandment was "Thou shalt have no other God before me." This was admitting the existence of other gods. So that if that tribe of savages did not have the innate idea of the god now worshiped by the Christian, and other tribes had other gods, how can we identify the present idea of a god, with the god, or gods, of the primitive man anywhere.

Another asserted evidence of the existence of a god is design in nature. How could everything work so harmoniously without a designer? Newton calculated the attraction of gravitation without considering a designer, although prior to him, Kepler had established the three laws of planetary motion with the idea that the planets could not be held in place except by an angel at each star to hold it from moving to some other place. But when Newton concluded his calculations, his mathematics had not led him to a personality but to a natural cause, viz., attraction of gravitation. This dissipated Kepler's idea of personal force. But, says the theologian, "Newton believed in a god and God created the force that is called the

attraction of gravitation." Newton believed in a God just as all other believers believe, without evidence. His reasoning led him not to the fact of personal control of the universe, but to a natural law which does not require the assumption of a personal creator to make it valid. Now, if his successive steps of mathematical reasoning had finally and irresistibly led him to a personal cause and nothing else, then there would be evidence of its existence. But instead he, a nominal believer in that God, was led by his mathematics straight and true to a natural abstract principle and the figures refused to go any farther. Has anyone on that account ever doubted the validity of Newton's "Principia"? But the theologian, while not questioning the conclusions of Newton's "Principia," yet goes right on believing just as he did before and just as if Newton's masterly investigations had not led in the opposite direction from a personal creator. It was the same with all investigations that had been made to find the causes of phenomena. Copernicus upset the geocentric idea of Genesis, and Darwin in the profound scientific pursuit of the causes of species with an unquestioning belief in a personal creator preoccupying his brain, was compelled by the trend of the facts to reluctantly walk in the opposite direction from the assumptions of theology, and landed where the facts had blazed the way in the natural method of mutation by natural selection. There is every evidence that he would have much preferred to be led to a personal cause. So it has been with the sciences of chemistry, anatomy, physiology, biology and psychology. The pursuit of these necessitates the abandonment of theological methods and terminology. The method of science is empirical,—

inductive. Necessarily what therein does not come through the senses must be ignored as not evidence. Occasionally something not seen is inferred from something that is seen, like the location of Neptune by Leverrier and Adams in 1846, before they had actually seen the planet, by the perturbation it had made in the movements of the nearest seen planet. But always these assumptions are in the line of induction, not idealistic intuition. In no instance, moreover, has any inference of a supernatural cause for natural phenomena been thus developed. The facts have never led directly to a personal cause for any effect in nature; yet the theological brain goes right on ignoring the significance of these facts, believing just as the world did a thousand years ago before there had been any true astronomy, geography, biology, psychology, chemistry, or physiology.

"The persistence of force" or the figurative expression "Nature" or the Universe is the natural embodiment of truth and power. It never changes except by the laws of universal evolution. Appeals for a change of its laws are never heard. Whatever it does is for the good of the whole universe. It is infinitely kind to those who observe its laws. It works constantly towards strength and harmony. Weakness is constantly giving way to strength, and comparative strength to greater strength. It is constantly doing the best for mankind, because mankind is a part of phenomena; and phenomena are the results of the cosmic operations of the persistence of force. Therefore it does not answer prayer. It could not do so, without introducing changes that would eventually cause the annihilation of mankind.

It might indeed answer the following wise and cunning prayers of the Parsee. "I prayed for deliverance, and to prove the efficacy of prayer I became my own deliverer. I prayed to be set free, and then I prayed that mine own hands should set me free. I do not bemoan misfortune. To me there is no misfortune. I welcome whatever comes."

The universe of evolution recognizes only that knowledge and wisdom which control man's real relationship with phenomena. It carefully protects him who knows how to avoid those natural catastrophes so destructive to life on this little globe. But when it does destroy individual life, it is careful that nothing essential is lost. The form, only, is changed to other forms, and all the retained energy even, is preserved for use in combining the elements again into newer and perhaps higher, and more complex bodies. But perhaps, not into conscious organisms, having memory of former existence. The processes cannot be changed by any desire that man may express to have it otherwise. This is scientific religion.

Charles Darwin was an absolutely honest man. He would always state the case against himself. If he found himself on the wrong road in his scientific investigations, he would instantly turn about face, and follow the trail just as it was blazed by the facts, wherever it led. He was a seeker after the truth only, and not to establish a preconceived theory. He founded his theory upon the facts disclosed by phenomena. He did not assume a theory, and then publish only those facts which supported it. He published all the facts, and all the objections to the theory. Then, by inductive reasoning, he connected the facts together, into the most reasonable conclusion

that could be drawn from them. Darwin simply made plainer what before was more or less dimly perceived by every thoughtful observer, that the current and historical theory that happiness or pleasure in the creature is a design of the Creator, is a misconception. He emphasized by his discoveries that the highest complex sentience of man is evolved from the materials at hand, viz.: the natural and ordinary matter and motion, not "spirit," and that natural selection, by the survival of the fittest, though harsh, and painful to the unfit individuals, is the only method to accomplish that end. But it is more than probable that design, in our conception of it, does not enter into the problem. The "meaning" is just what the reason of man can see in the phenomena.

I have said that Mr. Darwin's powers of observation and his ability to draw from them correct conclusions were wonderful. A striking confirmation of this occurred at the Leicester meeting of the British Association in 1907. In Section A, "Mathematical and Physical Science," the president, Prof. A. E. H. Love, in his opening address explained a dynamical theory of the origin of continents and oceans. During the explanation, which is too elaborate and technical for delineation here, he was led to make these remarks, viz.: "Sixty-nine years ago Charles Darwin wrote,— 'The form of the fluid surface of the nucleus of the earth is subject to some change the cause of which is entirely unknown, and the effect of which is slow, intermittent, but irresistible'. * * * In parts of the Southern Pacific a depression represented by harmonics of the third degree is superposed upon an elevation represented by harmonics of the second degree, and we should, therefore, expect to find the depth of

the ocean to be increasing gradually in this region. The region in question is that of the Coral Reefs and Coral Islands such as Funafuti, and the result is in accord with Darwin's theory of the formation of coral reefs." This theory of coral reefs has been heretofore attacked by certain physicists of eminence. But here we have a singular confirmation of it in the necessary logic of another branch of physical science, and the change in the form of the fluid surface of the earth's nucleus, so sagaciously observed by Mr Darwin, is traced to a theoretical cause in the dynamical changes that must follow from the interaction of all the elements in the evolution of a globe like the earth.

Earthquakes, volcanic eruptions, change in the forms of oceans and continents, are some of the visible effects of such evolution. Mr. Darwin's observations and writings potentially anticipated, or foreshadowed, such theories as this of Prof. Love's. I venture to predict that other confirmations of Mr Darwin's observations and tentative theories in physics given casually in his works will continue to be made, as future scientific investigations may result in fixed theories. His copious investigations set forth in his written works covered a vast field of evolutionary thought of great assistance to future science.

There is very much published misconception of the principle of evolution by natural selection. There is no more striking method of emphasizing the reasonableness of the principle, than to first quote some of these authors and then point out wherein they fail to reach the real meaning of the theory. Robert Mackintosh, B. D., M. A., D. D., in his work, "From Comte to Benjamin Kidd, the Appeal to Biology, or

Evolution for Human Guidance," says, "Natural selection seems to imply transferring of minute random variations into definite serviceable changes. If everywhere there is movement, the movement *ought* everywhere to result in progressive efficiency or adaptiveness"

Natural selection is a negative, not an active positive force. It does not transform. When the variations naturally occur, and are serviceable to the organism in its struggles, or efforts for existence, when they become hereditary, tend to establish new species. The new species will be better adapted than the species from which it is descended, to its environment, and we may call that progression. The word "ought" presupposes design, or teleology in the way of "progressive efficiency," as man comprehends it. A natural law "cannot but" happen. The moral term "ought" is not applicable to an inevitable phenomenon. Men "ought" always to act morally. But to say that "natural selection" ought to do anything it does not do is a misapprehension of the principle. What he should have said is, "If everywhere there is transformation, this cannot but result in changes of form better adapted, whether we can see progressive efficiency in such changes or not."¹²

If Mr. Mackintosh cannot see progress so far in the evolution of the Universe as it now is from the original nebula, perhaps he may think there has been progress in the theological hypothesis, that man only six thousand years ago was created perfect, and so degenerated by the time of the flood that his Creator had to annihilate him and start man again; that he again so degenerated that the Creator then sent his Son to die on the cross to redeem him. If he find

fault with the former theory because at all points it does not show to his mind progressive efficiency, what can he say in favor of the latter theory in that regard?

He further says, "Dissatisfied with my dwelling, I built myself a house exactly suited to my personal needs. That is real improvement. But forthwith I have to accept an appointment in a different town, and must sell my new house at a loss, for whatever it will fetch." But at this point his argument fails. The building of his house was not a real improvement, because his voluntary acceptance of a call to another place compelled him to sell his house at a sacrifice. As a "designer" of his own permanent welfare he was a failure. He should not have built a home that he would have to sacrifice so soon. It is more than probable that natural selection in the survival of the fittest does not do things this way. "The improvement due to building for myself is forfeited and turns to the opposite." It turned to the improvement of the welfare of the person to whom he sold at a sacrifice. And the Ice Age made the earth better adapted to the changes which evidently brought on that epoch. "Now, in the far-off past, our planet is said to have passed through more than one ice age. Of course, so tremendous a change in environmental conditions involved the forfeiture of past progress." (Does not this prove that progress, as we conceive it, is not a part of phenomena?) "The tests were all (however gradually) altered. The last became first, and the first last. The unfit were not found fit; while the fit proved unfit. Physiological capital was fatally depreciated, like machinery thrown out of use by a better invention. Only here there was no better invention." This is applying theological reasoning to nat-

ural phenomena. The theological and moral terms he uses are not applicable. The same argument will apply to what seems to be Dr. Mackintosh's belief, that of a flood, in place of a glacial epoch. Either an ice age or a universal flood "involved the forfeiture of past progress," more especially the flood, because that is asserted to have occurred, when the earth was occupied by peoples, in an advanced stage of evolution. If the argument is a sufficient refutation of the theory of natural selection, it is also fatal to the theory of a Divine Providence, as an All-Wise Ruler. The glacial epoch could not be interpreted as a "forfeiture of past progress." Nature makes no mistakes. Whatever occurs naturally is not only right when interpreted cosmically, but is undoubtedly the best for the welfare of man himself. The ice age was the result of natural conditions, which if not resulting in covering part of the earth with ice would have perhaps resulted in something yet more destructive. It seems to have resulted in leaving a large part of the globe passed over in a condition of made soil, which man took advantage of, in adopting agriculture as a pursuit, and means of sustenance. It left the surface better adapted to the evolution of a more highly organized man. The proper question is which theory,—that of evolution, or the theological,—the better interprets the natural well known facts, and involves the least inconsistency.

Progress, as conceived in the human brain, does not express the cosmic process. Man in himself has made what we term progress. He has evolved from a lower order to what we deem a higher one. That is, as changes occurred in the form, the temperature, the solidity of the earth's surface, the environment to

which all life on our globe must conform, correspondingly changed. The forms of life fitted to the changed conditions were the variations of former life best adapted to survive. Nature selected these by the method of adaptation. This is natural selection. While the record shows that biologically man became gradually more specialized, and heterogeneous, with an adaptation to a wider and more complex environment, this may be called progress. But some other lower forms of life, being adapted to all the changes for several geological epochs, did not change, and the word progress would not apply. The best is the adapted—the fit. Our ethical idea of progress toward what we term the angelic, or divine, does not express the observed process of Nature.

The word evolution, as defined by Spencer, better defines the actual state of facts. When a glacial epoch occurs, that life now best fitted for its environment becomes unfit, and is dissipated, only the arctic forms of life then survive in the regions covered by the ice flow. On the other hand, if the earth became hotter there would be a corresponding change of life, that man might think was decidedly a retrogression, instead of progression. Or if it became too hot, life would become entirely extinct.

The principle is, that the survival of the fittest is not what the theologian would call the best,—but it is always the form adapted to the immediate environment. It is evident then, that the theologically good and moral, that is, the human beings that have made most progress in obeying the decalogue, and the conventionalities of society, are not the ones whom Nature preserves in a crisis like that of the glacial epoch, nor of an epidemic even of disease that occa-

sionally afflicts mankind. However much so-called progress such have made, if their physical organisms are not adapted or fitted to the changed physical environment, their religious orthodoxy avails them not. This is a fact, patent to any intelligent observer of the laws of nature, whether he is a believer in a personal providence, or in the law of evolution. It also shows, that design, as that word is applied to human affairs, is not adapted to the processes of Nature. In other words, that we have no brain centers capable of responding to any meaning except the well known evolutionary phenomena.

But it is no argument against individual, and sociological progress in methods of mental development, by education. Man's struggle for a wider and higher responsiveness to his environment is a natural part of the scheme. He could not stop it if he would. This begins with the new-born infant, when he reaches out with his little hands to touch everything in sight. The practice thus begun is the reaction of his brain, especially the motor centers, to an environment, and the registration of an experience, which continues through life, and to which every new image, made upon his brain, is referred as memory, in the power of association. In this way only can the image of "immediate experience" be changed, by fusion, with the associative image, the latter being produced, by former experience, into the mental condition called knowledge.

The fact is that nature does not change, and if there is a personality behind phenomena, neither does he change in any way the laws of nature, because man sets up a religious, social or moral system for the regulation of the individual and society. It is

therefore evident that the laws of the social order must contain in their own working a remedy here for violations. Nature pays no attention to them.

So talented a botanist as Asa Gray, who wrote a book entitled "Darwiniana," asked Darwin what would convince him of design. This is amazing to me. This question implies that Prof. Gray, having adopted the theory of design, desired to find facts, or a line of reasoning to support it. The question should have been, "Does a logical interpretation of all the known facts exclude or establish the idea of design?" Design is compatible with creation, but not with evolution. If there is a designer, back of phenomena, then he is the principle, and not evolution. But Prof. Gray called himself an evolutionist and was a great admirer of Darwin.

IV. Honors to Him.—Darwin, unconsciously to himself, but following where his brain best responded, finally achieved a real triumph, and left behind him a name that will never die. In this sense he is immortal. For, in the language of another, "Evolution, as a law of derivation of organic forms by descent with modifications, is as certain as the law of gravitation."

Darwin was seldom in the public eye. When he did appear at the Linnean Society, or elsewhere in public scientific associations, he could scarcely believe that the applause was meant for him. Yet no man who ever lived was more entitled to it. He did not start out to do a great thing, but did one of the greatest.

To hear the current comments upon Darwin, in the theological world, one would think he was a man who wrote the "Origin" with a fiendish design to overthrow Christianity; whose hand was against every

one, and every one's hand against him. I think the foregoing pages will show how erroneous was this view of him. Yet, in his life, he was almost universally honored, and at his death was buried in Westminster Abbey.

The list of societies that had elected him to honorary membership covered almost every civilized country on the globe. He stands at the head of scientific investigators, and writers. These honors were the results, without any preconceived design, purely of patient work at Down, an obscure country place where he settled on a few acres for life in 1842. His inherited wealth gave him ample leisure to pursue continuously his favorite experiments, without any interruption, the only money he ever earned coming from the sale of his published works. He labored, and wrote in almost perfect obscurity, away from the eyes of men, with no thought of applause, and apparently no design, other than to discover the true law of natural phenomena. But he found "tongues in trees, books in running brooks, sermons in stones, and good in everything."

If great honor was heaped upon him by man, whom his investigations, and writings seemed to have lowered, but in reality did not, in scientific classification, what would be the tribute to his genius from all animals below man if they could convey in written language, their appreciation of what he has done to raise them to a nearer relation to the only animal that has a written language? Even the worms, and barnacles, which before had small place in science, and the plants that he elevated in the scale until they seemed to move and think like animals, would turn

toward his blessed memory, as the sunflower follows the sun with its admiring gaze all through the day

His ultimate standing in science was the simple result of following the truth wherever it led him. If the facts he perceived, proved to his mind any preconceived belief, that was already popular with men, so be it. But if they demonstrated a result in the opposite direction, his honest brain no more hesitated to adopt it, than he would hesitate to drink pure cold water when he was thirsty.

Conclusion.—The question is not whether Darwin was absolutely correct in all his scientific views, or in all his inferences drawn from his great array of facts, but the real question is, "What theory of nature is most in accord with phenomena as seen by the best intellects yet developed?" As far as I know all scientists accept the theories of "The Indestructibility of Matter" and the "Persistence of Force", nearly all, "The Mutability of Species," perhaps not all "The Unity of Nature." But very few of them are open in frankly admitting, as Darwin finally did, the absence of design.

Let us hope that other peerless minds, like those of Copernicus, Newton, and Darwin, will confine their studies and writings to natural phenomena, and thus bring us farther on the road to intellectual phenomenism, which means dissociation from metaphysical authority.

CHAPTER III

An Interpretation of Herbert Spencer's Philosophy.

Now that Herbert Spencer is dead, and his autobiography is published, his work is finished. An estimate can be made of the scope and real meaning of his philosophy.

Darwin confined his efforts almost entirely to biological evolution. But Spencer enlarged the scope of the theory to apply not only to biology, but to psychology, sociology, and ethics, but not to the metaphysical, or theological. His autobiography makes plain what was before largely misinterpreted, namely that he did not intend his agnosticism, or his belief in the unknowable, to be a part of his "Synthetic Philosophy." He did not thus escape the anathema of the formalists, nor did he succeed in convincing any sincere student of his work, that he was not essentially what idealists call a phenomenist. His weakness lay in his fear of the epithet "materialist," and while his contention may be true, that he is no more a believer in matter as a thing in itself, than he is in spirit as a reality, yet anyone who writes scientifically upon the principles of evolution, must necessarily use only the evidence that comes through the senses. These are the phenomena of matter and motion alone. Whoever approaches the investigation of psychical phenomena, or consciousness, from what is called the physiological side, is called by the idealists and metaphysicians a materialist. It is true Spencer showed very clearly that matter in its manifestations, the only way we cognize it, is as wonderful and

subtle as the pretended manifestations of so-called spirit, yet this did not protect him from the scorn and vituperation of those who would not have it that way. His autobiography makes plain, also, why he did not include inorganic evolution in his philosophy, for which he is criticised by James Ward. His physical strength was not equal to the required additional labor.

Spencer, in speaking of his work called "First Principles," says, "My surprise was considerable on finding that in most cases (referring to notices and reviews of the work), the important part of the book was ignored, and that such notice as was taken, was taken of the part which I regarded as relatively unimportant"*

"I saw it would be needful to preface the exposition" (system of philosophy) "by some chapters, setting forth my beliefs on ultimate questions metaphysical and theological; since, otherwise, I should be charged with propounding a purely materialistic interpretation of things. Hence resulted the first division, 'The Unknowable.'

"To me it seemed manifest that the essential part of the book,—the doctrine of evolution,—may be held without affirming any metaphysical, or theological beliefs, * * * such attention as was given" (by reviewers) "was in nearly all cases given to the agnostic view, which I set forth as preliminary."**

He further says that those who undertake to guide

*Autobiography, Vol. II, p. 85

**Autobiography, Vol II, p 86.

public opinion laid more stress upon the preliminary metaphysical part, than upon the real system of philosophy, the "law of transformation, everywhere unceasingly displayed by existences of all orders."

I regard the first part of "First Principles," "The Unknowable," as weakening the force of the Synthetic Philosophy. Evidently Spencer, having therein to his own satisfaction proved that whatever may be behind the apparent, cannot be recognized by the human intellect, intended to dismiss the subject from his own mind. But not so the great majority of his disciples. They dismiss from their minds, not the metaphysical unknowable, but the knowable principle of material evolution, and continue to worship in place of the anthropomorphic Hebrew God—what Spencer means by the general term of the "persistency of force, or the Unknowable." Worship of the unknowable is an anomaly. What is unknowable does not exist for the human senses. Therefore the moment a religion is attempted to be organized upon that idea, it at once recrystallizes into the former anthropomorphic theology.

Mr. Spencer himself has also given considerable occasion for the effect, of which he complains, by frequently referring in different parts of his "Synthetic Philosophy" to certain phenomena, as manifestations of this Unknowable Absolute, and thus making it to that extent really a part of his exposition. In other words, he frequently treats the Unknowable, as knowable.

When the work began to appear, his neglect in England by the most of the so-called educated classes, was contemptuous, ostentatious, and largely after the manner in which James Ward treats him in his "Nat-

uralism and Agnosticism." But he received somewhat better treatment in the United States, largely through the efforts of his scientific and personal friend, Prof. E. L. Youmans, the writer of the article on "Evolution" in the American Encyclopedia. The "Synthetic Philosophy" has been extensively read in the scientific world. It can well be said that the general ideas of it, have firmly established themselves in the intellects of the intelligent among even his opponents. Very few now speak outright against the general principle, that all things have been evolved, and the terms used by Spencer, to describe the operations of evolution, have become so incorporated into the ordinary language used by thinkers, that they are frequently used in the pulpit. In fact, now is a time of reconciliation of evolution with special creation as evidenced by Dr. Lyman Abbott's "Evolution of a Theologian." He says that evolution is God's way of doing things.*

But Moses did not put it just this way in "Genesis"; neither did Darwin, Lamarck, nor Spencer, treat the doctrine from that point of view. But Spencer's unfortunate first part on the Unknowable, as the assumed power behind phenomena, is responsible for a large number of evolutionists, who keep up the connection in a much more anthropomorphic way; who actually continue to repeat the words of Spencer, that such power is even "welling up in consciousness" This assertion means that an Unknowable Absolute is known. The ablest, as well as one of the first in time, of this school of theological evolution-

*Since the above was written Dr. Abbott has declared his unbelief in a personal God

ists was John Fiske. His "Outlines of Cosmic Philosophy" is practically an exposition of evolution along the lines treated by Herbert Spencer in his "Synthetic Philosophy." He also indorses Darwin's theory of natural selection. Fiske, of course, saw clearly how incompatible the theory of evolution is with design, and especially with the anthropomorphism of current theology. He seemed worried over it, and devoted many chapters to a reconciliation of evolution, and its corollaries to the "religious spirit" of the people. It is significant that the treatise was first given in lectures at Harvard College

He is true therein to the teachings of science, that matter and motion are the only perceptible elements of evolution. Their constant interchange is done by the method of evolution. But in order to preserve the basis of the "religious sentiment," he assumes, as does Spencer, that these phenomena are the manifestations of an unknowable power, whose form, or substance cannot be defined, but who takes the place of the anthropomorphic God heretofore creating, and ruling the creations, in the beliefs of the people. But he lays very much more stress upon this than Spencer did

A line of human action, or a code of life, must be evolved from what we know, not from the unknowable. This is science, and on this Spencer really founds his philosophy, and his code of ethics consists of man's correspondence with the knowable objective environment. Fiske in order not to be called an atheist, or a materialist, discredits Comte, Haeckel, Buchner, and all those, including Moleschott and Vogt, who insist on the same natural moral code, but who also

refuse to treat the unknowable as knowable. They refuse to consider it as an element in man's intercourse and correspondence with phenomena. Man cannot propitiate an unknowable power. Man has nothing to fear from phenomena, and nothing to hope, except that he may keep a proper correspondence with them. Science, and good hard sense, both teach man that what he needs for the improvement of his condition is knowledge of phenomena, by which he can avoid those manifestations detrimental to his being, and further properly adjust his life, his whole organism, to the so-called laws of Nature. The change of form called death is one of the essential phenomena. If so, man will come to accept it as such, and not dread it as he does now. He will postpone it as long as possible. A God to be worshiped should be knowable, and hence anthropomorphic. This means that he is part of phenomena. Worship, however, of a phenomenon is a paradox.

We do not know the absolute. Neither could the absolute, should there be such, know us nor anything finite. The only thing known to the relative is the relative and the only thing knowable to the absolute would be the absolute. It would be impossible for the absolute to receive sensations and have the perceptions of the relative. So it is illogical to think that we the relative can perceive other than phenomena or have any conception of the absolute. The ideas of the absolute and of the relative are so different in structure as to have nothing in common. Human senses are in correspondence with only the changes in human experience, and even if there could exist an absolute it could not have the same expe-

rience. Therefore there could be no correspondence between the two.

The so-called religious historical sentiment, that is, also, called spirituality, and various other names, is the outgrowth of the limited knowledge of natural phenomena, or natural cause and effect, always characteristic of the mass of the people.

In this sense supernaturalism is a natural evolution in equilibration with the slow co-evolution of brain, and is a phase of the perpetual readjustment of the organism with its environment. Only such environment is an imaginary one. This readjustment is going on now and will continue as long as organic life exists. The worshiper of the Hebrew God of the Bible is consistent with this. He clothes him with human attributes. He personifies him in a spiritual sense and appeals to him in prayer. "The various proofs for the existence of God are merely interesting attempts of self-affirmation on the part of the human being." (Feuerbach). At the same time he must know that natural phenomena are persistent and unchangeable. Eventually such subjective condition of the religious world will merge into scientific religion and the evolved brain will co-ordinate its functions with objective phenomena from which it will receive the essential code of conduct it is now seeking from behind the phenomena. Until then theology will continue in some form as the only possible condition to imperfect correspondence. One form will be a code of human laws, which at the same time will act as moral commandments.

Any scientific thinker, who confines his reasoning to the inductive method, has nothing to say of the

unknowable. Darwin never alludes to it. There is nothing in the requirements of philosophy, much less in science, nothing in ethics, or sociology, in short, nothing in the real welfare of the organic world, including man, that necessitates considering an "unknowable absolute."

The position is taken by other writers beside Fiske upon the historical facts of psychology, that because mankind seem to have always thought in certain channels therefore there must be some truth in the beliefs thus arising. But this presupposes, that the validity of the truth lies in the conceptions, or generalizations of the *average* human brain. The history of slow human advancement, the changes of belief from age to age, the establishment of the fallacy of the Ptolemaic astrology, the various steps by which science has overthrown preconceived conceptions in physics, chemistry, biology, and psychology, in short, the limitations of the human intellect, are sufficient refutations of this position. The real fact is that mankind have been controlled by delusions from the beginning.

It is also true that the only criterion of truth is the scientific induction of the best brains, i. e., those brains best adapted to the investigation of phenomena. They see the reality in the manifestations. The aggregate attributes perceptible to man constitute the "thing in itself." The unity of the objects forms the universe and that is the whole or absolute truth. The idealist who believes in the superior efficacy of "intuition" asserts, that the evidence of the senses is not reliable; that what is seen, heard, felt by touch, tasted or smelt is often misperceived or misinterpreted. It is true, that for untold ages mankind was sure

that the earth was immovable, and that the sun and stars moved in orbits around it. Until the seventeenth century the brain was supposed to be only a gland, not in any way connected with the "mind." The heart was supposed to be the central organ of the "mind" or "soul." But eventually the senses of some men finally perceived the falsity of these delusions. They made the discovery, not by "intuition," but by scientific investigation. The truth was not revealed to them by inspiration, but by inductive reasoning, from observations through the senses of sight and touch. This method brings the only evidence we have of the truth of experience. While neither all, nor a majority of mankind, can thus arrive at the truth of natural phenomena; yet they could not arrive at such truth in any known way. But, here and there, a brain is evolved like those of Copernicus, Newton, Kepler, Darwin, Huxley, Virchow, Pasteur, Watt, Arkwright, Stephenson, or Edison, whose investigations made entirely by use of the senses alone lift mankind from the low plane of error, illusion, and delusion to the higher conception of scientific truth. They do this too in opposition in most cases to the combined effort of organized theology and idealism.

Fiske distinctly says that the molecular, or chemical, process of nerve tissue in the organism does not produce thought. His expression is, that molecular motion accompanies the thought; that physical pulsation and the psychical explosion are parallel. Spencer says, that of the two supposable phenomena of the conversion of thought, or idea, into matter and motion, or the transmission of matter and motion into thought, or idea, he would prefer to believe the latter,

but is doubtful. If the thought, or what Fiske calls the psychical explosion, is always accompanied by the nervous shock or motion, but is not produced thereby, what is it produced by? Fiske does not tell us. It is well to state in this connection that molecular motion of nerve matter, is not merely mechanical movement, by change of position of many round atoms of substance. The molecules of matter that make up the tissues of living bodies, are the storage batteries of energy which was transformed from the animal and vegetable food taken into the digestive apparatus; and molecular motion in the nerve tissue means that this energy is being released by catabolism in the form of psychic phenomena; that is, into thought and ideas. Materialists call this a physical process, while theologians call it a spiritual process. Idealists contend that the result,—thought, or ideas,—is the cause of the phenomenon, while realists assert that the physiology of the living matter produces the phenomenon. It is really the escape, by a destruction of the proteid molecule, or cell, of the stored energy, or retained motion, which has been metamorphosed from other animals or vegetables, in the form of food, by the human being. This destruction of nerve tissues is followed, or accompanied by, an observed psychical phenomenon, which is variably called thought, idea, image, conception, imagination, or memory. Those molecules of matter thus destroyed, are quickly replaced in the living organism, from the blood, by a process called anabolism,—the whole process of destruction and construction is metabolism. All the mental and physical activity of the organism depends upon this physiological process, and ceases entirely when the metabolism stops.¹³

William Wundt, who not always confines his exposition to the strictly scientific, and sometimes steps beyond the bounds of science to that of philosophy, says scientifically as follows:

"It would fall within the scope of physiology only if we could interpret the psychical processes themselves as molecular processes, i e, in the last resort, as modes of motion, or as physical energies. This, however, we cannot do, the attempt fails at once under whatever guise it may be made. Psychical processes refuse to submit to any one of the physical measures of energy, and the physical molecular processes, so far as we are able to follow them, are seen to be transformed variously enough into one another, but never directly into psychical qualities." He means, by this, that the method of transforming sensations into ideas and concepts is not perceptible to the senses of self, nor is it observable in the brains of others. I have commented on this in some of the preceding pages.

"In saying this we do not of course reject the idea that psychical processes may be regularly attended by an interchange of physical forces, which, as such, form a proper object of a co-ordinate investigation, by the molecular mechanics of the nervous system; nor do we deny, what would naturally follow, that psychical symptoms may be taken as indicative of definite physiological molecular processes, and that they in their turn, if it ever happens that we know more about them, may be taken under certain circumstances as indicative of psychical conditions. But such a relation between the two departments is entirely compatible with their separate independence,

with the impossibility at any time, or by any means, of the reduction of the one to the other.”*

I do not think he is justified in making this latter assertion. It does not follow from the statement of facts, because “separate independence” of the psychical from the physical cannot be proved, and has never existed. The psychical is so inseparable from nervous tissue, that no one to my knowledge has ever perceived it as an “independent” phenomenon. All the evidence shows it to be perceptible only as the motion of nerve tissue in animal life. There is no line of demarcation. Wundt wrote the above-quoted words after he had previously been forced to acknowledge the unity of all phenomena in a physical basis, as follows:

“If physiology is obliged, by the uniformity of physical action throughout the universe, to accept the postulate that the processes of life have their ultimate basis in the general properties of matter, psychology finds it no less obligatory to assume, in the same matter, the universal substrate of natural phenomena, the presence of conditions which attain to expression as the psychical aspect of vital phenomena. But this latter statement must not mislead us. The latent life of inorganic matter must not be confused, as hylozoism confuses it, with real life, and actual consciousness, nor must it be considered with materialism as a function of matter.” Why not?

The fact proved, and the only one proved, by the measurements of Wundt, is that no device has yet been invented, so subtle, as to measure the psychical effects of these escapes of energy when the destruc-

*Principles of Physiological Psychology. Vol I, p. 102.

tion, or explosions, occur in the molecules; nor did any method tried, by whatever device, indicate the presence of any "independent" power producing through these explosions, the phenomena. In the sixteenth century physiologists held that "the blood which has come through the septum is mixed with the air thus drawn in (into the left ventricle of the heart from the lungs) and by the help of the heat, which is innate in the heart, which was placed there as the source of the heat of the body by God in the beginning of life, and which remains there until death, is imbued with further qualities, is laden with 'vital spirits' and so fitted for its higher duties." It seems to me, that Wundt's conception of an "independence," separate from the physiological, in the production of thought, is not quite so crude as the ignoring of the chemistry of heat, and considering it as the direct gift of God, because the chemists of that day had no "measurable" evidence that oxidation of the blood in the lungs produced the heat of the body. But his "separate independence of molecular motion and psychological phenomena" is only less apparent as a superstition, than the former is now. It has always been that unknown causes were traced to a divine power by the majority of mankind. Van-Helmont, 1577-1644, held that "the food absorbed from the stomach and intestines is in the liver endued with natural spirits, while in the heart the natural spirits are converted into vital spirits, and in the brain the vital spirits are transformed into animal spirits." The various "independent powers" called "spirits" have all faded away as the true knowledge of the human organism came by the senses to the intellect of man. It is not sur-

prising that such ideas were evolved prior to the advances lately made in chemistry, physiology, biology, and physics. But now, when the indestructibility of matter, the conservation of energy, the persistence of force, the evolution of all things, are so well established by scientific evidence, it seems almost incredible that an able author of physiology and psychology can contend for independent causes for any of the activities of the human organism. Here is an extract from the latest treatise on physiology, viz, "The Nutrition of Man," by Russell H Chittenden, professor of physiological chemistry of Yale University:

"The human body is a maelstrom of chemical changes; chemical decompositions are taking place continuously at the expense of the proteids, fats, and carbohydrates of the tissues of the food, the stored-up energy of these organic compounds being thereby transformed into active, or "kinetic" forms of heat and motion; while carbon-dioxide, water, urea, and some few other nitrogenous substances are being continually formed, as the normal waste products of these tissue changes. * * * In other words, the body is in a perpetual condition of chemical oscillation, constantly consuming its own substance, rejecting the waste products which result, and *giving off energy in the several forms characteristic of living beings.*" The italics are mine. One of the forms of energy characteristic of living beings is thought, or any form of psychic phenomenon, and like the muscular activities of the body are caused by the chemical decomposition constantly taking place in the body.

If the process of formation of ideas (cognition) is

unknown beyond the physiology of nervous structure, and psychologists refuse or fail to connect the psychical with the material, then what advance has been made since Descartes' time in attributing all thinking to a soul entity?

The molecular motion in the brain tissue, being psychical phenomena, both are recognized as the same thing. The molecular motion is the psychical phenomena. Wundt never can find a measurable test, scientifically, of the purely psychical phenomenon, such as he found in the muscular contraction, resulting from an external sensation, which he describes on pages 67-75, Volume I, "Physiological Psychology," because he is trying to measure something that does not exist in a measurable form. But while the evidence cannot be thus reduced to the same scientific basis as mechanical motion; yet such constant connection, between such molecular mechanics of the nervous structure, and the psychical phenomena of the organism, made up so largely of such structure, seem to be one and the same thing; just as molar motion is the attraction of gravitation. The three laws of Kepler, from which attraction of gravitation was mathematically derived, are descriptions of the observed forms which such motion always takes. That motion produces the harmony or "mentality" of the universe. Wundt, of course, does not explain the nature of the independent power, so far as I have read him. But, I suppose, he must mean "a gift of God." As yet science has discovered nothing in phenomena but matter and motion, or perhaps motion alone, in the form of centers of energy. Max Verworn in his paper, "The Relation of Physiology to

Other Sciences," read before the Congress of Arts and Sciences at the World's Exposition in St. Louis in 1904, says, "We occasionally meet with the view, that in the exact natural sciences, nothing shall be the object of investigation, which cannot be measured according to mass and number. This conception, destined to hinder the development of scientific knowledge, as the first step towards the explanation of many phenomena, can in most cases only be made by qualitative and not quantitative investigations. * * * Physiology must still leave a large place for qualitative investigations, although the ideal goal is mathematical demonstration of the processes in the living organism, from which we are still far removed." See page 407, Vol. 5, Proceedings of the Congress.

There are very many mental conceptions in the practical affairs of men whose boundaries cannot be measured by exact mathematical lines. Lord Macaulay in discussing the revolution of 1688 in England said, "A good action is not distinguished from a bad action by marks so plain as those which distinguish a hexagon from a square. There is a frontier where virtue and vice fade into each other. Who has ever been able to define the exact boundary between courage and rashness, between prudence and cowardice, between frugality and avarice, between liberality and prodigality?" This is because the extreme mobility of our nervous action and the intimate meshes of its conduction paths, the perpetual motion of its minute particles, make the psychical phenomena so blend that the subject fails to perceive the true line of demarcation. They cannot be measured mathematically. So it is with our conception of the unconscious process

of thinking. It eludes the subtlest mathematical tests, because the measurements cannot be applied to a material substance like muscular tissue, such as is a mere reflex action. If the brain is simply a bundle of nerves to convey spirit, as copper wire carries electricity, then science should turn its attention to the study of "spirit," as it does to radio activity. But when it undertakes to do that, it finds nothing but a blank, nothing is found except molecular motion accompanied with explosions of energy, and that is measurable as such, in metabolism.

It is not unthinkable that matter and motion in the form of mobile nervous ganglia can directly produce the common thought of mankind when we see them in other combinations and relations, produce tints of changing sunset, the rainbow, the solar spectrum, chemical attraction, the attraction of gravitation, and the evolution of all forms. These are objective phenomena, that existed prior to any known psychical phenomena. Their connections with their real causes are as obscure, as are those of mental phenomena with their real causes. They are all the results of particular combinations, and phases of matter and motion, and our senses never perceive them except in these combinations. Thought is simply the kaleidoscopic reproduction of these things by presentations, through the physical nervous structure. The mind is a spectrum of objective phenomena, produced by sensations coming through the eyes, ears, nose, skin, and mouth, and what is called self-feeling or the kinaesthetic. There can be nothing in all phenomena then, but what matter and motion, in the form of persistence of force, produces. Feeling is the observation of the effect by

the organism. This is consciousness, or awareness, or a still better definition of consciousness is, that it is a relation between certain objects, the number being limited by the capacity for impression of the neural structure.

It is said by Wundt, that states of consciousness cannot be transformed directly into forms of molecular, or mechanical, motion; nor the latter inductively traced, as causing the former, by any measurable method, such as is applied to the transforming of heat into mechanical motion. At the same time he recognizes the inseparable, simultaneous, or serial connection of the two states, if not as cause and effect, yet as antecedent and subsequent facts, by devoting the first volume of his "Principles of Physiological Psychology" to the anatomy, and physiology, of the nervous structure as the substrate of consciousness. Having measured the effects the nerve substance transmits to the muscles of the body, he says, "Now we have no right to suppose that the laws which govern the transference of nervous molecular processes to the contractile substance, are at all different from the laws which regulate their transmission to other substances, whose properties show them to be related to the nervous elements,—more especially therefore to the substances, that are of peculiar import for the psychical aspect of vital phenomena, the elements of the sense organs. Now, the processes thus analyzed remain always physical and chemical processes. It is never possible to arrive, by way of a molecular mechanics, at any sort of psychical quality or process."* But the muscular movements and the "changes set up

*P. 101.

by the action of stimulus in the sensory cells" are the psychical processes. The changes set up by the stimulation of the sense organs, by the energy of the environment, e. g. light, heat, resistance;—by the manifestations of cosmic energy, in the multitude of effects, in the perpetual apparition, are, as Wundt says, physical and chemical,—but they are also the psychical,—judgment, memory, and the emotions being some of the changes thus set up.

On page 321, Vol. I, "Principles of Physiological Psychology," he says, "The simplest psychical content discoverable by analysis of the facts of consciousness always presupposes, as their physiological substrate complex nerve processes, the result of the co-operation of many elementary parts. No psychical process can be imagined, however simple it may be, which does not require for its origination a large number of functionally connected elementary parts." Now, if the psychical quality of which he speaks in a previous citation, is something independent of molecular, or physical process, then what does the above language mean? I am not able to perceive the independence, and must maintain the unity of the physiological and psychical.

In order to account for the phenomena of motion, or energy, in matter in all its forms, it does not strike the ordinary observer that matter, as we see it, can of itself produce the visible effects. But after scientists adopted, by empirical observations, the theory that atoms are mere centers of energy, there seemed to be no difficulty in neglecting former supernatural cause for these effects: an angel at each star to support it in position and produce its attraction of gravi-

tation was not a necessary assumption, after the true nature of matter was scientifically discovered. I wonder how long it would have taken theology to arrive at the now acknowledged well known truths, which science has wrought through a natural use of the human senses; such as the attraction of gravitation, the indestructibility of matter, the conservation of energy, and evolution?

But it can be contended, on general principles, that all human phenomena, physical or psychical, are most probably a part of natural force, called cosmic energy, or the persistence of force, a part of the physical universe, the same as matter. The peculiar phenomena called vital, and those vital phenomena called psychical, cannot be separated from the mental conception of the universal postulate. They are natural and governed by natural laws only. The mind, or consciousness, of man, is impossible without the neural structure always accompanying it, and the neural structure without its function, or without its genetic correspondence with cosmic energy, in other words, without its excitation by the objective, is nothing more than any other functionless matter, it is inorganic.

If we interpret thought as a molecular process, that is, as images formed by the psychical device, we get rid of the dualism of thought and object. This is what "immediate experience" does, as I understand it. In that, the object is the only thing; and that object is always an immediate reality; it is a phenomenon, either of things as we "know" them or of an abnormal differentiation of such things in the diseased brain. In other words, if thinking is a part of substance or

matter, there is no necessity to discuss it as existing apart from substance or objectivity. The brain is that form of matter which produces what we distinguish from the physical form of phenomena, as psychical, and its correspondence with other forms of matter is analogous to the relations that all forms of matter hold to each other. "The sciences ultimately refuse to recognize dualism. The world is only intelligible by science on the assumption that it forms one coherent system. A philosophy based on the special sciences cannot recognize anything outside the material universe." "Darwin and Hegel," by David G. Ritchie, p. 90. This is monism and is both materialistic and idealistic. Huxley has shown that the two views lead scientifically to the same conclusions.

I agree with Fiske that whatever, in Christianity, is essential to the building of individual character, ought to be, and will be preserved. This is found on its ethical side. The natural parts of the present decalogue will remain the moral code, except a change of permanence can come, with a change of intellectual conception of a natural character building code of conduct, more efficient, and that efficiency perceived by mankind. His idea is, that the idea of Deity must not be given up, but it must be a deanthropomorphized Deity. Deanthropomorphization means the fading away of the personal idea entirely.

Fiske says that Comte's and Buckle's theories of civilization failed because they failed to consider the historical fact, that peoples always have thought theologically, and that evolution teaches that this kind of thinking is natural under the conditions surrounding it; that it cannot be changed suddenly by science and

philosophy, both of which omit or ignore Deity. This is so. It can be replaced only slowly, by other thinking along scientific lines by the method of intellectual evolution. But it does not affect the truth of Comte, and Buckle. They were well aware of this historical fact, but were better aware of the delusions connected therewith. Fiske's "Absolute Unknowable" is just as opposite to this historical theology, as that of Comte and Buckle, because the personal element is absent.

Comte's philosophy, which may have been too isolated, may be epitomized thus: society is a self-adjusting organism and humanity is constantly growing and changing. Comte's conception of it formed a basis not only of ethics, but of a religion dealing with realities and conformed to science. He put behind him the dreams of theologians and the assumptions of metaphysicians. "Spiritual things" to him were the life of humanity and not emanations from an "unknown absolute" located beyond this world. "While systems rose and fell, what was permanent was the onward movement of the human spirit." There was no other palpable or practical for human beings. "True religion was a matter essentially concerned with human life, the co-ordination of human purposes, the regulation of human conduct. * * * We know nothing of the causes of things, we know only the laws by which phenomena succeed one another." Beyond this is the dreamland of theology and metaphysics. It may be true that no great religion has been established out of the original intellectual conception of one man, and that the philosophy of August Comte failed of acceptance by the world at large because he cut loose from all preconceived opinions on religious matters. In other words,

it seems that the evolution of religions and philosophies is based on the same principle as biological evolution, viz., that each advance, or variation, is only a modification of the former species, and not a new creation unconnected with any previous forms. It may be that this is so, but Comte's "Positive Philosophy" was original by being purely intellectual, and not containing the conjectural and emotional. If it was not adopted by a large number of mankind, this was the reason. Mankind is governed by the emotions, but little modified by the intellect. Hence the absurdity known as the conception in the average mind of the past and the present that a supernatural "unknowable absolute" is controlling the affairs of life and society. I sometimes think, however, that the persistency of that idea in the brains of men, in the past, may have been the only conception possible to them, until further development of "mind." To my mind mankind is gradually growing out of that conception, and until they do by the natural laws of evolution a sudden change of belief, such as would have resulted by the too sudden adoption of Comte's or Spencer's views, would have resulted disastrously. For the habits of mankind are crystallized around the central idea of the supernatural and those habits can be adapted to new ideas only gradually in the same way that crystal forms in inorganic matter in nature are dissolved and new forms gradually recrystallized by the slow operation of physical forces, the same that gradually carve the surface of the earth into new shapes in the successive geological epochs. While these delusions regarding the supernatural may thus have a relative value which may seem to give them an adumbration

of truth, yet in the abstract they are not true and those keener intellects who perceive their essential falsehood cannot proclaim their truthfulness in order to maintain what theologians may call historical perspective. The mere persistence of a mental misconception and its universal acceptance do not of themselves transform it into a true conception. Otherwise, the geocentric conception of the universe prior to the time of Copernicus would still be true. While we tolerate the hallucinations of the insane as being the only possible perceptions his diseased brain is capable of making, and do not expect to force upon him true perceptions until the pathological conditions have changed, yet we do not call these abnormal conditions normal simply because they seem true to the subject of them. Nor do we cease efforts to change the abnormal brains to normal ones. So it is in the efforts of scientists to prove their contentions of natural science when these are in opposition to the pre-conceived notions of mankind.

The inconsistency of Fiske in his "Outlines of Cosmic Philosophy" consists partly in the manner in which he first knocks down anthropomorphic theism and then sets up the "Unknowable absolute" as an object to satisfy man's religious spirit. (Chapter 2, Part 3, Chapter 3, Part 3) The error consists in supposing that the latter, as an object of worship is any less anthropomorphic, than the former, except in name. The worship of an unknowable does not satisfy any supposed natural inclination of historical worship, the principle of which Fiske was so fearful of violating, as he asserts Comte and Buckle had done.

But what Comte and Buckle did ignore was not the historical fact that mankind have believed in the super-

natural, but the truth of anthropomorphic theism, and it is what Fiske has really ignored.

Fiske's formula is this: "There exists a *power* to which no limit in time or space is conceivable, of which all phenomena as presented in consciousness are manifestations, but which we can know only through these manifestations." My statement would be, "The phenomena that come to us through our senses are known to us and thereon we can base our lives and thoughts. The aggregate natural phenomena constitute the only power"

Fiske's formula errs, as did Spencer's, in stating that we can know the Unknowable through its manifestations. The only way we know the knowable is by manifestations. If we can know the Unknowable the same way, then there is no difference to us between the Unknowable and the knowable, which is a paradox."

The Breadth of Herbert Spencer's Teaching. — There is an article in the *Cosmopolitan Magazine* for February, 1904, by Logan C. McPherson, another disciple of Spencer's entitled, "The Breadth of Herbert Spencer's Teachings." I take exception to his assertion therein that Spencer "has shown the design that all the threads of existence are weaving." Spencer did not undertake to penetrate the design, if any, lying behind phenomena. No human being can do that. He could not do so because he says himself it is the Unknowable, and only the personal can design. He inferred there might be an Unknowable Absolute, but did not penetrate the design. If there is any design in the phenomena of the universe, it is not perceptible to man, because that means either the knowing the beginning and the end, which Spencer specifically disclaims, or it means that the Unknowable

has communicated that design in the manifestations themselves. Whatever man's reason derives from phenomena is the only "meaning" they have. Mr. McPherson also states in the article, "The Synthetic Philosophy formulated by Herbert Spencer attempts, within the limits of human cognizance, to explain why the suns and stars have formed, why there is life; why the brain has developed"; etc., etc. This assertion is the same, in effect, as the design above mentioned. "Why" means the object in view, or the reason leading to the phenomena. Evolution means process only, and not why. The word Mr. McPherson should have used is "how," not "why." He himself seems to recognize this, toward the close of the article, in which he says, "In defining the boundary between the realm of the knowable and the realm of the Unknowable, Mr. Spencer ascertains the limit, beyond which the inquiry of science is and must forever be without avail; that limit beyond which lies, and must forever lie, the sphere of religion." He divorces religion from the knowable, and from any connection with the phenomena which are the sources of all knowledge; and relegates it to an imaginary region bare of facts, where man's reason is blind and powerless. I hardly think any intelligent man will care to spend a moment's time of his short life in such a fruitless realm, when he might formulate an altruistic and ethical code within the known realm.

It is well to repeat, that man knows only what comes through his own senses, together with what instincts he has inherited, by virtue of nerve structure, from his long line of ancestors; that is, his intelligence is his correspondence with objective environment. But it is not necessary to separate his religion

from his intelligence. His religion to be of most utility to him, should be based on knowledge of phenomena. He will either do as he has always done,—set up a subjective Deity, that he thinks is knowable to him, but which in reality is not; or regulate his life by known phenomena, and his relations with them. This is phenomenism. Man's so-called mentality is a unit. He has not a scientific side, and a religious side. One part of his mentality cannot exist in an unknowable realm. It is all in the realm of the knowable. Whatever he does from day to day must have the approval of his intellect. That approval cannot be given to his worship of an unknowable. He now clothes the Hebrew God with human attributes, in order to make him knowable, writes a book, calls it God's book, as a guide to his life, and in every way makes him a personal, knowable entity. All this meets with the approval of what intelligence he has. Now, when his intellect becomes so enlightened, by scientific investigation, as to make a Herbert Spencer of him, he perceives that the Hebrew God is incompatible with objective phenomena. He then writes a "Synthetic Philosophy" to take the place of the former delusion, and bases his code of ethics on phenomena, as Spencer does, and relegates theology to faith in the unknowable. Mr. McPherson says, "Mr. Spencer's utterance here is abundant proof that he is not a materialist, that in the depth of religious instinct, in the profundity of religious emotion, he yields neither to seer, nor to mystic, to no apostle of any faith." This is not the impression "Synthetic Philosophy" makes upon my brain.

Mr. Spencer says himself, that he wrote his philosophy to take the place, in the minds of those who could

comprehend him, of former theological conceptions, that are rapidly fading away. I think Mr. Spencer would be surprised to be compared in his "profundity of religious emotion" with seers, mystics, and apostles; or to be held as altogether admirable, because of any supposed parallelism between his views, and methods, and theirs. If his "Synthetic Philosophy" means anything, it is the supplanting of the religious emotion of seer, mystic, and apostle of faith, notwithstanding his chapter on the Unknowable. I wonder if it were not grim humor in him, to relegate all such to that unknowable realm which he claims to have discovered, where their profundity of religious emotion would have free course, and leave the knowable realm to science and scientific religion. Undoubtedly Spencer in his autobiography, when complaining of the misapprehension by his disciples of his real philosophy, was referring to such as Fiske and McPherson. Hence my dwelling so long on their writings. I think Spencerism means natural phenomenonism, and not supernaturalism.

There is an analogy between Spencer, the synthetic philosopher, and Shakespeare, the greatest poet, and dramatist, in that both are persistent in holding the mirror up to Nature, and also in never scolding the *status quo*, but in having infinite charity for those who are always the creatures of imagination. Everything, however disgusting to civilized and refined eyes, is accounted for by Spencer as the natural effects of evolution; while Shakespeare tells in his incomparable manner the exact truth of every situation, and gives the language of the character, not his own.

Darwin said of Spencer, that perhaps, he was the greatest philosopher that England had produced. He

certainly possessed intellect of a very high order. He was a voluminous author of scientific and philosophical works of the most abstruse character. In commenting in these terms upon Mr. Spencer's works I exclude his metaphysics and mean only his biology, psychology and sociology. His accuracy of expression was such, that in many instances he was compelled to invent his own terminology, in order to express the fine shades of meaning. His great fame will rest on his "Synthetic Philosophy," in which he lays the basis of correct reasoning in the second part of his first volume, which he entitled "First Principles." The first part of it is a very ingenious, and profound, exposition of the relativity of all knowledge. But its ensemble consists of what he calls agnosticism. He pretends to reconcile religion, or theology, and science, but says in his autobiography that this first part is no part of his philosophy. It is metaphysics.

It is certainly apparent now, to all thoughtful readers of the whole work, that it would have been better had it begun with the second part of "First Principles," in which he discusses the general principles of evolution, and evolves from the reasoning a comprehensive definition for both evolution and life. The technical treatment of the subject, in process and method, is then divided into its usual scientific branches, viz., into biology, psychology, sociology, and ethics. This, of course, is an artificial division for the benefit of the human brain, in its analysis and study of the natural processes constantly and simultaneously operating, as practically a unit, in both the objective cosmos and its subjective image. In other words, phenomena as apparent to the human senses everywhere are simply different phases of the same process, viz., the interchange

of matter and motion. In reality matter and motion may only be two phases of the same thing. The atom may be an integration of millions of ions, whose ultimate unit is an electrical discharge, the one element of Faraday with two polarities. Therefore the "Synthetic Philosophy" is monistic.

Suffice it to say, that Spencer's treatment of all these subjects is at once profound and exhaustive. He begins with the basis of the whole, in the physical evolution of biological forms, and ends with what now seems to be the crowning function of structure, the most abstract and beautiful altruism.

His "Synthetic Philosophy" is epoch-making. No writer after him, who follows in his footsteps, and in the same method, so far as I have read, is so convincing and so exhaustive. Notwithstanding an occasional lapse into the mazes of the Unknowable power, "welling up in consciousness," and his disposition to minimize the efficiency of natural selection, as a theory of evolution, he stands as the great philosopher of natural cause and effect. Spencer says himself, in his autobiography, that he failed to grasp the method of evolution, as Darwin did. He has written a work that will give his name a deathless fame, and will do as much as any other scientific treatise, to educate the masses of mankind out of false conceptions, and into true ones.

I think Darwin is the great discoverer of the method of organic evolution, and Spencer the greatest exponent of its universality. In my judgment these two are now exerting the widest influence in turning the thought of the world into scientific, and therefore natural channels. Hence I follow the first chapter of this volume, "A Short Outline of the Principle of

Evolution," with observations on these great expounders of its phenomena. Every one, who would like to study the evidences of natural evolution, which I think is the basis of correct reasoning, should read the works of these profound thinkers.

CHAPTER IV.

The Rhythm of Motion.

Rhythm in the Stellar Bodies.—It is easy, for one familiar with uranography, to determine the hour of the night, or the month of the year, by the constellations that come in view at any point; for example, the zenith, in regular order, from dark to dawn. The apparent motion of the fixed stars is about one degree each night, from east to west, making the entire circuit of the imaginary concave vault in a year.

The day, and the month, can also be told as accurately, by noting the point on the western horizon of the apparent setting of the sun. I have often seen it disappear below the south end of the Cheyenne range of the Rocky Mountains, in almost exact line with the steeple of a certain church, frequently as red as blood, reminding one of Emile Breton's painting called "St. Agnes' Eve." This point is $23\frac{1}{2}$ degrees north of the plane of the earth's equator, and the date, of course, is June 21st. It then slowly moves south day by day, until on the 21st day of September, it sets directly in the west on an extension of an east and west line, looking just before it disappears, like the headlight of a great locomotive, coming from the west to the east. It does not stop here a moment. It never stops. It keeps on south until, on the 21st

day of December, viewed from Pueblo, Colorado, it goes down behind the high point of the Greenhorn range, of the same mountains, just south of the Hard-scrabble Gap, and $23\frac{1}{2}$ degrees south of the equator.

It then turns again north, setting each day in exactly the same spot it did one year before, completing the round trip from the northern point, and back again, in $365\frac{1}{4}$ days. The rising of the sun is analogous with this description of its setting. All this is an optical illusion. Yet for many centuries, this is the way all mankind thought this phenomenon occurred.

This apparent rhythmic motion of the sun, and stars, tells, with unerring language, to astronomers, since the time of Copernicus, the real motion of the earth on its axis daily, and its free, rapid movement in a spiral rhythm in its orbit through space, marking for us the artificial divisions of time. Time, therefore, is a measure of space, and we are only conscious of it by the alternations of night and day, or other rhythms. In other words, it is our consciousness of changes in phenomena. The spiral motion of the earth, in its orbit, is apparent to the observer of the difference, in the angle of the axis of such a constellation as Orion, for instance, to the plane of the horizon, between its apparent rising and setting. In addition to these two motions, the earth has nine others—the *third* one being the precession of the equinoxes. *Fourth*, revolution around a common center of gravity of the earth and moon. *Fifth*, what is called nutation. *Sixth*, variation in the obliquity of the ecliptic. *Seventh*, variation of eccentricity. Dr. Croll, and Prof. James Geikie account for the probable recurrence of the Glacial Period, by the change of the eccentricity

of the earth's orbit, together with the precession of the equinoxes, and apsides, the periods being perhaps 10,500 years. Our winters are now very gradually getting colder. *Eighth*, the line of apsides. *Ninth*, perturbations. *Tenth*, the motion caused by a displacement of the sun's center, when all the planets, except the earth, are on one side of the sun. *Eleventh*, the movement of the solar system, as a whole, toward a point in the constellation of Hercules.

Phenomena on our Planet.—The astronomer Flammarion says, "Our planet is alive, with a certain stellar life which we cannot understand. Magnetic currents circulate in it incessantly. The intensity and direction of these currents vary day by day, year by year, century by century. In 1666 the compass, as observed in Paris, pointed exactly to the north,—after that it turned toward the west. The deviation was eight degrees in 1700, seventeen degrees in 1750, twenty-two degrees in 1800. It further increased one-half up to 1814, when it commenced to return toward the north. The deviation was twenty-two degrees in 1835, twenty degrees in 1854, nineteen degrees in 1863, eighteen degrees in 1870, seventeen degrees in 1878, fifteen and one-half degrees in 1893. It still continues to decrease and it is probable that it will point again to the north about 1962."

This coming back of the needle to a point it once occupied is rhythm. If it make such change once, it will again.

In addition to the above, he notes a daily and yearly variation of the needle, which appears to correspond with the number of spots visible on the sun; also, that "the magnetic needle enclosed in a cellar of the Paris Observatory, follows the *aurora borealis*, which lights

its aerial fires, in Sweden and Norway” It has been discovered in the last half of the 19th century, that every eleven years, the sun spots wax and wane. The periods are not uniform, but the average is 11.1 years. This periodicity affects, not only the electric currents of the earth, but many other phenomena, such as the rainfall, and resulting scarcity, or abundance of food products. During the maxima of sunspots, when the spots have passed the central meridian of the sun, directly opposite the earth, particles of matter, called solar dust, are carried by radiation pressure from the sun to the atmosphere of the earth in 45.5 hours. This solar dust is charged with negative electricity. When it reaches the earth it effects the needle very strongly and produces the lights, called *aurora borealis*. The sun spots also produce peculiar phenomena on the planet Jupiter. At their maxima that planet shines with a white light, and at their minima with a deeper red. (Arrhenius.) All this is rhythmical.

A tourist can sit on the front porch of the Fire Hole Hotel in the Yellowstone National Park, and watch the geyser called “Old Faithful” spout hot water 125 feet high, every sixty-five minutes. When the water has subsided, he can wander away to see the exquisite tints of the Rainbow Lake, or the beautiful purple of the Morning Glory geyser, so named because of its perfect resemblance, in the shape of its opening, and color of its sloping funnel-shaped sides, to that flower. By looking occasionally at his watch, he can so time his return to the hotel, as to arrive in just sixty-five minutes from the last explosion, and be sure he will see another, because “Old Faithful” is true to its name. In fact, the flow of all the geysers is rhythmical. The visitor and his conveyance, in the regular rounds

through the National Park, thread along the upper waters of the Yellowstone River. Like all rivers, its flow is in a winding curve, first to one side, then to another, along sloping banks, covered with verdure, until it comes to the first falls, where it pours over a declivity, and soon after over a much higher one, with a deep-toned murmur, into a cañon, whose sides are high and gorgeously tinted with several shades of yellow, variegated, here and there, with deep reds and olive greens. The prevailing color of this most beautiful of all cañons gives the name to the river. All this is rhythmical.

The traveler leaves the park and goes to the Pacific coast. He sees the contour of the earth, as it appears, everywhere the eye rests on its surface, in a succession of swelling hills, mountains, and valleys, covered with verdure that sways to successive breezes, watered by periodical rains, and bathed in the sunshine of day, followed by the shadow of night. He sees the water of the ocean, in rhythmic play upon the shore, not only by successive waves produced by the wind, but in the swelling tides that regularly follow their flow, as faultlessly as day follows night, by the diurnal revolution of our globe.

As he sails away to the north, to visit the Alaskan coast, and the Muir Glacier, he follows the windings of the shore, among islands of all shapes, except the rectilinear, for nowhere does he see a straight line. Everything is rhythmical, everywhere is the line of beauty; no shore without its motion of musical waters; no space without its lights and shadows, that follow each other in rhythmical motion. This description, of one part of the surface of the earth, is merely typical of the whole.

It is the same in the social affairs of men. History teaches that nations rise and fall, with great regularity; that peoples flourish for a time, then pass away, and are followed by others, who are governed by the same rhythmic law. For example, the red man of the Western Continent is rapidly passing away, by contact with the stronger, and more coherent civilization, of the Indo-Germanic race, that had previously produced the same result in the European half of the Eastern Continent, upon its primitive inhabitants. This widely roving race has just struck the black races of Africa, and the older civilization of Asia. The same result must follow. The law of rhythm, if it is fundamental, teaches that this Indo-Germanic civilization, which modern history now calls the English, must eventually succumb to a still stronger one, but, probably, an intellectually better one.

All mankind have regulated their domestic and business affairs by the rhythmic motions of the earth around its axis, and in its orbit. The regular succession of day and night, and of the seasons, entirely control all the actions, and thoughts of mankind. There is an occasional spasmodic individual effort to reverse this natural order, but always with more or less disastrous effect. Man cannot change the night into day, nor fail to observe the orderly succession of the seasons, in all his operations. He may as well try to overcome the attraction of gravitation, by building a railway to the moon. The equilibrium in his own organism would be quickly destroyed by any change his efforts could make, while the universal rhythm of all natural phenomena will continue, without a jar, perpetually.

Even the rise and fall in prices in trade follow the

same law. Periods of business activity, and prosperity are invariably followed by dullness, and financial depression. Buckle says that marriages follow the price of corn. They are governed in number more by what are called material conditions than by sentiment. "New York City reports about 1250 more marriages in 1901 than in 1900, Baltimore about 100 more, and Cincinnati 252 more. These cities can be taken as examples, and when marriage statistics are made up elsewhere, they will doubtless show the same record of increase. This was expected. The year was a prosperous one, and according to all past experience it should have shown an increase in marriages. The vital statistics of civilized nations illustrate this fact. So well has this become known in England that the registrar general's office in that country looks upon the marriage rate, as the barometer of national prosperity, and as able to point out periods of good and bad times, as infallibly as the money market."*

In short, materialistic things, that is, economics, have always controlled what are called the sentiments and the emotions. The life of the individual, as well as of the state, has always been shaped and controlled by the means of sustentation, its scarcity or abundance and their mode of production. This is the materialistic conception of history. For instance, the historical motive of the voyage of Columbus to the new world was not sentimental but entirely materialistic, to find a new route for trade with the East. Columbus received the capital necessary for his voyage of discovery of the East Indies, because such discovery

* Philadelphia Sun.

would bring wealth and power to the Spanish nation. At that time the overland route of trade with the fabulous East was in the hands of the Turks, and a route by water was of immense materialistic importance to Europe, especially to western Europe.

The emotions, imagination, and everything that the world has been in the habit of calling the spiritual, are simply functions of nerve tissue, and we are governed entirely by so-called physical laws. Try mentally to separate any one of them for a moment from its physical connections, and it vanishes, it eludes the profoundest research. No separation of these functions, from their material connection, is possible. They are simply forms of manifestations of substance, another name for motion and matter. When the philosopher makes a study of his own organism, or by introspection views the working of his nervous structure, he finds the same rhythmic law. The heart beats, the respiratory functions, the peristaltic action, sleep and waking, are all governed by the same principle. Every well informed physician is familiar with the ebb and flow of disease, in quantity and quality.

The mentality of the human organism is controlled by the same principle. It is the rhythmic response of the nervous tissue by means of molecular motion, to the objective environment. That environment is rhythmic, therefore psychical phenomena are likewise. The correspondence of thought, to the relationship of conditions in the physical environment, makes it the echo of those conditions. Therefore it is rhythmical. It could not be otherwise. Even the poet's imagination, and what he terms his inspiration, are periodical. His hours of inclination, and ability to use his brain, are regularly followed by his hours of rest and dis-

inclination. The co-ordination of the organism, with the subtle law of rhythm, is as unconscious to the ego, as are the before-mentioned eleven motions of the earth, no one of which he feels. Therefore, the organism must have been evolved, and not suddenly created, else there could scarcely be such perfect accord. The law of evolution is therefore a reasonable inference from the foregoing facts.

The constant, ever-recurring phenomena of life, and death, are perfect examples of the rhythm of matter and motion. Molecules of organic matter are ever integrating and disintegrating. When they come together, in the form of plastic physiological compound units, under favorable conditions, they attract units of the same order. A growth is thus commenced, and aggregates, in time, a moving equilibrium, called an organism, which attains a certain size and age, then gradually loses its organic motion, until it no longer remains a moving, but a perfect equilibrium,—called death. Then its molecules, responsive to the incident force of heat, rearrange themselves into their original, and comparatively homogeneous state, only to again condense to a definite heterogeneity, when the favorable conditions arise, and thus repeat the rhythm of integration and disintegration.

It seems to be evident, from the few examples given above, which might be extended to include every phenomenon in organic life, that such life is essentially a correspondence with the inorganic, depends on it for its existence, the harmony of the connection meaning life, in proportion to such harmony; complete inharmony meaning death.

Rhythm, Fundamental and Universal.—It might be profitable to trace, in this connection, the scientific

form any of them have assumed, by selecting new centers, either in inorganic, or in organic bodies. As all bodies known are made up of these same atoms of the original nebula, then all bodies partake of the same rhythmic motion, which, as far as scientific investigation has gone, is common to all matter everywhere, and in every form.

This is the nebular theory of Laplace, and Kant modified by later theories of Lockyer and Arrhenius. But now comes J. C. Vogt, with a work called, "The Nature of Electricity and Magnetism on the Basis of a Simplified Conception of Substance," with a theory, accepted by Ernst Haeckel, but so far as I know, by few other scientists, at present, that the primitive principle of matter is not the vibration, or oscillation of atoms in empty space, but condensation. The centers of this universal condensation correspond, in general, with the atoms of the other theory. They differ, however, in possessing the functions of sensation, and inclination, or what Haeckel calls, "will movement" of the simplest form. Moreover these "pyknotoms," as they may be called, do not float in empty space, but are surrounded with an extremely attenuated intermediate substance, which represents the uncondensed portion of primitive matter. Thus we have the ponderable substance, with its power of sensation and inclination, and imponderable ether, which is matter homogeneous.

Now, these condensed atoms, and their motion, or function, together, form a universal substance; substance being matter and motion combined.

Chemistry, which deals entirely with substance, demonstrates the likes and dislikes of these atoms. They have their loves, and hatreds. These are con-

stant. All bodies, both organic and inorganic, are made up of these atoms of substance. The characteristics of these bodies, or aggregations of atoms, are nothing more than the differentiated motion, or function, always existing. Most of these aggregations are capable of chemical analysis. But about eighty of them are called simple elements, because they cannot be analyzed by man; yet, they probably are aggregations of these primitive atoms of substance. Some of these "simple elements" make up all inorganic bodies. Others combine, in definite proportions, in less stable molecules, and form organic bodies, that is, bodies with organs. But the same functional atoms, that is, atoms with sensation and inclination, form the content of all.

Haeckel calls this discovery of Vogt's, of the principle of condensation, the greatest of the nineteenth century. But it does not affect the law of universal rhythm in ponderable matter, which is the substance of all visible forms. Imponderable ether, being homogeneous, cannot be composed of atoms, otherwise it could not fill all space, yet the transmitting of light and heat waves is rhythmic. Ether is a theory of scientific necessity, as a support of the vibratory theory of light and heat. As all the different forms of matter, from inorganic granite, up to organic man, are simply the differentiated aggregations of the atoms of the nebula, after they have condensed into substance, they must all have the rhythmic motion, and all, in different degrees only, respond to incident forces. This response is what Haeckel calls the loves and hatreds of atoms.

The difference, between the organic and inorganic, seems to be one of mobility only. The four principal

simple elements entering into organisms, are oxygen, hydrogen, carbon, and nitrogen. Three of these are the most unstable of substances. The combination of them, in what is called an organic cell, a combination that only the laboratory of Nature, by the process of evolution, has heretofore produced, by first forming them into what Spencer calls compound physiological units, perhaps by chemical affinity, results in that obscure form of motion called life. But the essential original characteristics of the atoms are not changed, by any combination they can make, and this rather obscure mobility of substance, which we call life, is perhaps the aggregated mobility of the atom, increased by chemical combination, and electricity, into physiological units at present little understood.

An organism, being composed of units of the above-mentioned four simple substances, together with added sulphur and phosphorus, in the nerve matter, is very unstable in its composition. It is therefore greatly responsive to incident forces in the environment. The constant mobility results in an ever changing combination of chemical units, which is termed molecular motion. In the muscular and bone tissue this molecular motion is life. In the nerve tissue, in addition to vitality, it is mentality. But inorganic matter, being the segregation of units, having great chemical attraction for each other, are more stable, and in comparative equilibrium. The point to be observed is, that the difference is one merely of degree, the ultimate atoms of both being all alike. It must be understood that the word "atom" here used is a generic term covering all phases of the ultimate unit—whether atom, ion or electric discharge, or a center of function.

This principle, of condensation of matter, which

Haeckel says was discovered by Vogt, is most likely the explanation of the inherent tendency in everything psychic, as well as physical, in the universe, to integrate. As the organism of man is made up entirely of the atoms, or centers of energy, which at one time formed a part of the nebula, from which the solar system was evolved, their tendency of condensation is still the characteristic principle in their perpetual motion; and this tendency has imparted to the grey matter of the brain the mental impulses of mankind to cling together in the struggle for existence in the aggregations of families, tribes, communities, states, and nations. It resulted in the establishment, of not only churches, creeds and religions, but of that great foundation of every religion, and all ethical codes—the brotherhood of man.

As early as 1871, St. George Mivart, who wrote a book in opposition to the sufficiency of Darwin's theory of "Natural Selection," said, "It is quite conceivable, that the material organic world may be so constituted, that the simultaneous action upon it of all known forces, mechanical, physical, chemical, magnetic, terrestrial, and cosmical, together with other, yet unknown, forces, which probably exist, may result in changes which are harmonious and symmetrical, just as the internal nature of vibrating plates causes particles of sand, scattered over them, to assume symmetrical and definite figures, when made to oscillate in different ways, by the bow of a violin, being drawn along their edges. In such a way the reparation of local injuries might be symbolized, as a filling up and completion, of an interrupted rhythm." He seems to think this may be a prime cause of the differentiation of species.

The human, and all other organisms, are in such harmony with the before-mentioned rhythmic motions of the earth and stars, that they are unconscious of any motion, and only know it by mathematical reasoning. In other words, the organic and inorganic are perfectly equilibrated, and form together a moving equilibrium in the universe as a whole. This result is inevitable, because of the monistic character of the atoms, composing both organic and inorganic. This law of substance applies to both. This conclusion must follow, whether we adopt the kinetic theory of vibratory oscillation, or the pyknotic hypothesis of Vogt, and the universal rhythm, contended for, is not disturbed by either hypothesis.

This is monism, when it is found that all things in the universe are composed of identical atoms, or ions, and these may be merely centers of energy, or function. Monism means the natural evolution, from a nebulous condition of substance, or from the ether, which pervades all space, of all bodies in space, including our sun, and the planetary system, also organic life on the earth; and man, as a part of that organic life, including what is popularly called his mind, or soul. All these are natural, not supernatural products.

There is a certain degree of life in everything, latent in the inorganic, active in the organic. Hylozoism is true to that extent. At least, there is a constant change occurring in all bodies, and a readaptation of them to each other, and to the universe. The difference, as observed before, between the life of the organic, and the inorganic, lies in the degree of the mobility of its units. Not only rhythm, but every other phenomenon characteristic of the one, is, *in a certain degree*, char-

acteristic of the other. While thought would seem to be a function of the human brain alone, yet it is an arbitrary term, to define a form of molecular motion, that characterizes all molecules (compound units of atoms) in some degree, whether they exist in the grey matter of the nerve tissue, or in the primitive, and most inert rocks of the earth. There is a soul of substance in all.

Man has no monopoly of soul. He has it in a higher degree only, soul meaning psychical function or motion. Molecular attraction, whether in the form of love, or in the form of chemical attraction, is in substance, the same. Molecular repulsion is, in the same sense, hatred. These are strongest in the organic nerve tissue, less active in the muscular tissue, and the vegetable kingdom, still weaker in inorganic compounds. But in every form of substance, when the proper relations are brought to bear, the same results are produced in different degrees. This is the connection we are seeking.

Therefore, the observed phenomena, heretofore mentioned, have a fundamental basis, or final cause, in the nature of the monistic and universal law of substance, of which all things are composed. Rhythm of motion, in one form of matter, means the same rhythm of motion in quality everywhere. The nebulous molecules of matter, and the same nebulous motion attending them, make up, with only local differences of what may be called attraction, and repulsion, the phenomena going on everywhere in the universe. Could there be the same local attraction of gravitation, and the same incidence of other forms of force in quantity, the identical combination of matter would occur to a satellite of Arcturus, for example, as on our earth,

and the same forms of organisms, would evolve there, as here. The atoms there are identical with those here. But, what is termed morphology must be different in degree, or quantity, there, from what it is here; and therefore the integration of matter, in the forms of organisms, must be different, but in form only, not in function, or "soul." They are not exactly alike in form in any two localities, near or remote. All I know, about polarity of matter, is that inorganic matter, when it has integrated throughout the macrocosm, has formed in globular, and quasi-globular forms around an axis, similar to the earth, having a positive and negative pole, and that organic matter in the microcosm, or organism, does likewise. For instance, in the form of vegetation, it has for its type the uniaxial stem, leaf, and flower, with the petals arranged in a whorl. Whatever variations arise from these typical forms by different impacts of incident forces, vary correlatively the axis; but always the body can be divided through the axis into similar halves. Without tediously elaborating the details, this uniformity of axial integration, throughout the cosmos, may be identical with, or caused by, the rhythm of motion; or by the causes that also produce the rhythm. For there is undoubtedly a close connection between this universal rhythm, and such observed differentiated forms of energy, as the attraction of gravitation, electricity, and chemical attraction, all perhaps being mere variations of one cosmic force, viz., the dissipation of palpable forms of matter back to ether. The rhythm may be caused by the combination of all the forms of this energy. When Faraday said, that it is likely that the numerous so-called simple substances, would be eventually reduced to one, with two polarities, we can well

imagine, that the polarity meant, is really the same in principle as Vogt's condensation, the motion of matter in its tendency to integrate, or dissipate, in the monistic rhythmic manner now observable throughout the universe; always around an axis, having attraction at one end, and repulsion at the other. It is the evolution of harmonious bodies, or matter *en masse*. The properties of radium seem to verify the prophecy of Faraday.

The bearing that these conclusions have, upon the current ideas of "life," "soul," "mind," and "thought," is apparent to the thinker. It is generally believed in a hazy indefinite way, that these four words indicate:—the first three, entities, that have been specially created, and put into matter, only when it assumes certain forms; that thought is a function only of the human mind, as an entity; and therefore an agent having will of its own, and in no way a product of matter and motion. But the facts, heretofore described, seem to show that all these are natural effects of physical causes; that "life" is an obscure form of motion, differing in no qualitative manner, from all other motions of matter; that "soul" is the attraction, and repulsion, of ultimate centers of function wherever they may be, in the nebula, or in the human brain; that "mind" is the "aggregation of feelings" produced in all bodies possessing nerves, by the molecular motions of the nerve tissue; that "thought," or the process of getting ideas, is the result of the same molecular motion, in the neural patterns of the encephelon.

In former times, whoever wrote upon these subjects used the words "mind" and "soul" as entities, or substances, within the body of each human being. No

thought seemed to be given by Descartes, in his treatment of the Ego, to the anatomy, and physiology of the organism, as producers of mental phenomena. But in the papers, and discussions, in the psychological section of the Congress of Arts and Sciences of the World's Fair at St. Louis in September, 1904, I did not hear the word "soul," and I think not the word "mind." (There were two papers read in that section, that I did not hear.) The concept "consciousness" has taken their place, and the new science of psychology has compelled its investigators to make their first approach to a study of what was formerly called "mind" and "soul" through the material structure of brain and nerves. Now "consciousness" is being superseded by "pure experience." "Object" is the only thing known in the individual's correspondence with environment. "Subject," the method in the brain of perceiving, is not a part of "pure experience," except when it is made the object by the study of the psychologist, when it becomes the object to his perception.

So we conclude, that all things, organic and inorganic, have been evolved, by the same combination of the different forms of force, that also produces the universal rhythm of them, so as to conform, at every step of their evolution, to this rhythm. Life itself nowhere could be maintained, if out of harmony with it. Viewed through the eyes of philosophy, the correspondence of the human organism, in this rhythmic harmony with the environment, is a necessary, and, therefore, a beautiful law for the welfare of the species. If man would struggle intellectually to make this correspondence as complete as possible, he could make in that way the most of life, and this he will

do when his brain is relieved of delusions. Life must be regulated by the natural harmonious rhythm, pervading all things, or it will fail in completeness. The intellect of man is the latest product on the earth of the evolution of substance. Man is a part of, and one with, the whole, and necessarily must accord in his structure and function with every law that controls the earth in its movements, its temperature, its polarity, its currents of electricity, its rhythm. He cannot change one of these laws. He cannot change his location from this planet to another. If he could sail through space, and light upon some other planet, he would likely, at once, dissolve into the original gases out of which he was originally evolved, because he is not in accord with the local rhythm there. Therefore, this earth is his only habitat. The practical study for him to pursue, therefore, is how to make the most of his location, how to prolong his life, and enlarge his knowledge of himself and his environment; to study what his relationship is, to all the manifest phenomena of this cosmic force surrounding him, and his best means of keeping his being in such correspondence with them, that his organism may receive, in both time and space, all the benefits it is possible to obtain in his present form.

CHAPTER V.

Human Knowledge and Its Limitations.

I do not want to unduly minimize the greatness of man, but we must remember, that all we know about him comes from a very interested witness,—himself. He has the only written language. For instance, Shakespeare says of him:

“What a piece of work is man! How noble in reason!
How infinite in faculties!
In form and moving how express and admirable!
In action, how like an angel!
In apprehension, how like a God! The beauty of the
world!
The paragon of animals!”*

This is the fulsome eulogy of a poet, who is an “interested party,” and not a scientist. Now, hear what a scientist says on the other side,—one who did not write poetry, but who championed the rights of the animal, who is unable to defend himself, in written words.

Darwin in his “Descent of Man” says. “Some naturalists in classifying the animal kingdom, have given

* Hamlet Act 2, scene 2.

man a separate order. Man, having the only written language among animals, was enabled to do this, without the protest of the monkeys, who are not only in the same order with him, but man is not really entitled to a separate family."

That is the testimony of a scientist whose writings impress me as the purest seeking after nothing but the truth, that I have ever read. Darwin's classification would be based on the principles of evolution. In the 6th edition of his "Origin of Species," he gives the preference to embryological congenitalism, as the basis of animal classification. This would result in classification based upon comparative heterogeneity.

Cuvier's classification of the animal kingdom (which I believe is the popular one, and is a great advance on that of Linnaeus), gives man the separate order of "Bimana," and the monkeys a separate order of "Quadrumana." It strikes me that, if the hands made a sufficient differentiation of structure, on which to base an order, then the more hands one has, the higher would be the order. But "Bimana" is placed before "Quadrumana." In this connection, it would be well to remark that the naturalist, who from prejudice, or theological predilection, makes every effort to give undue prominence to man in the classification of the animal kingdom, may thus mislead the unscientific reader, and keep the good will of believers in theology, but even then he cannot stretch his scientific conscience sufficiently, to find any reasonable fit place for man, until he has gone down the scale, from kingdom, through branch, and class, to order, and if Darwin is correct (and I have no doubt he is), then he, and monkeys should be placed in the same order, and man reduced to, at most, a family of that order.

Now, if man had been specially created at the head of the animal kingdom, he certainly could be classified as such. In fact, in such event, he could not be classed with other animals at all. But, in order to be placed biologically, he has to take his organic position, with animals having backbones and mammae. This is a strong inference for his evolution from a lower order, not, however, from the present race of monkeys, but from the same lower order, from which the present family of monkeys emanated.

Classification, as said above, will eventually be based upon the facts of evolution. As a starting point, the cell will serve, and orders, classes, families, genera, and species will be determined by the degree of evolution, from a single cell to the heterogeneity of the most complex organism, or by the facts of common origin, as shown by the various steps of embryology.

Nature, who is the leveler of all ranks, and who is always uniform in her favors, and disfavours, will not allow man to arbitrarily repudiate his kinship to his brother, Orang-Outang. Mr. Darwin has clearly shown in his "Descent of Man" that the development of brain in man, therefore his great superiority in mind, is not sufficient to determine his natural classification. He says, "Therefore in determining the position of man in the natural or genealogical system the extreme development of his brain ought not to outweigh a multitude of resemblances in other less important, or quite unimportant points. * * * If man had not been his own classifier he would never have thought of founding a separate order for his own reception."¹⁶

Of course, mentally man is, in degree, in a class by himself. But this basis of classification is so variable that it is not sufficiently persistent on which to base an enduring physical classification. It does not indicate his genealogy, which is the object of classification.

Man has heretofore been appropriating the only "mind" to himself; not only this, but he dogmatically assumes that his mind, which he sometimes calls a soul, is a separate and distinct thing from the rest of his organism, which has been specially created for him alone, and is not subject to the laws governing organic life, or what is known as the physical universe. He would not give the smallest modicum of soul to any organism, not walking upright, and articulating words. A dog's articulation, by the wagging of his tail, would not suffice, however intelligent it may be. This dogmatic assumption of a soul assigns one to the Patagonian, whom Darwin designates as very much less human than an intelligent monkey. Now as naturalists have been giving man an artificial place, in the natural classification of the animal kingdom and theologians have, also, placed his physiology of nerve structure outside the reach of the laws of evolution, and declared it an immortal entity, and refused this distinction to other animals, it will be well to present, in simple language, a few facts and observations, showing man's true place in nature, especially, how limited man is in the scope of his intellect. This will show that while he is at the head of intelligent beings, yet he is so only in degree.

We dwell on one of the smaller planets of a solar system, which, if placed where the Pleiades now are, could not be seen by the naked eye. Our sun is only

a star; not larger than the third, and some astronomers say of the sixth, magnitude. Our earth is not a millionth part of the solar system in bulk, and our solar system is scarcely an appreciable part of the sidereal system.

"The orbit of the earth," says Edw. Clodd, "seen from the nearest fixed star is but a pin's point" The largest telescope yet made, as well as photography, fails to find any boundary to space, or any end to the countless globes moving in it. The longest diameter of our earth's orbit is more than a hundred and sixty-five million miles. The fixed stars, which are also suns, having systems of satellites, are so far away from us, that no difference can be perceived in their relative positions, whether seen from one end of this long diameter, or the other. The parallax of not over one hundred, of the millions of stars, has been determined. Our system, we are informed by astronomers, is moving as a whole, toward a certain point in the constellation of Hercules, or toward the star Vega, at the rate of four hundred million miles a year. But this does not necessarily mean that Hercules and the solar system will come together. For Hercules may be moving, as fast, in the same direction. I think it was President Jordan of Leland Stanford, Jr., University that said, "If a thermometer could be constructed, as high as Trinity steeple, that would measure all the degrees of temperature that probably exist in the universe, the degrees, in which it is possible for life to survive on the earth, would be no more than one stone in that structure."

How insignificant then is the earth, and all it contains, compared with what sight discloses to man; and how illogical to think that on such an obscure

globe there should be specially created a being for whom all the rest of the universe was created. Yet that is the idea, that controlled the theological world, down to the present day, and obtains yet among a great majority of Christendom! But there is no doubt that man's anatomy and physiology disclose, that, notwithstanding his insignificant location and physical limitations, he is or can be in correspondence with a certain environment, and that this environment while very limited compared with the infinite universe, yet is sufficient for man's real needs as a psycho-physical organism, who has evolved from the immediate environment, called the earth. Likewise, this limited environment is part of, and homologous with, the whole, and in knowing scientifically all that is possible to his capacity for cognition; he is really thus getting a vicarious knowledge of the whole as a phenomenon.

Man is scarcely a speck in the universe, and is correspondingly ignorant, but he can at least learn more of his vital relationship to phenomena, within the reach of his senses, and would be wise to confine his study to these. He has made wonderful progress, scientifically, in the last fifty years. The matter on the dry plate of the photographer, which is simply an extension in space of the sense of sight, is giving us more information of the universe, than the retina of the eye, aided by the magnifying power of the most powerful lenses, has heretofore perceived. The colors of the spectroscopic, produced by the motion of incandescent matter, by waves of ether, are giving us information heretofore unknown, and unperceived. Thus it is seen that human knowledge has its limits.

Of what does this knowledge consist, and by what process is it made available?

Human knowledge consists, scientifically, of two essential elements; or rather, one element polarized, by mental analysis, into two conditions: first, natural objectives, in the environment or realm outside the co-ordinating process of the nerve structure. I might state the point of view this way. That phase, of consciousness, having cognition, is the result of a correspondence between the nervous centers, and an environment made up of natural phenomena—psychical facts of all states of truth, or falsehood. In this view, knowledge consists of pure experience as we all have it, from day to day. To one individual it may be largely delusion, about an absolute. To the scientist, only the natural would appear. The forms of matter visible to us are aggregates of certain attributes. The impressions made upon our brains are phenomenal only, but these impressions are real to us. There is never any doubt, in the brain of the individual, as to the reality of the impression, and to him water, air, earth, fire are real things. To him, they are existences objective to his perception, and without this existence, he knows there would be no impression. He knows also, that should the impressions made on his brain by these objective things cease, it would be the result, not of the discontinuance of these objective forms, but his own cessation of the conditions of impressibility, or in other words, a change in his own form, which dissociates him from objective relationship. Therefore the contention of the idealists that there is nothing but impressions is not the common sense view. Second, sensations received through the nervous system from those objectives, into the organism, and there co-ordinated into feelings. Some of these feelings are again co-ordinated into abstractions, and gen-

eralizations by higher neural centers. This co-ordination of sensations, into mental phenomena in the cerebrum, might be termed a third element of knowledge. But, the whole mental process being, in my judgment, the result of molecular motion, it is preferable to make the co-ordinating process a part only of the second element, beginning with sensations. Knowledge is the psychical phase denoting the physiological wealth of associated, and systematized nervous action in the encephalon. It is the culmination of sense impressions, acting by molecular and chemical motion, through said nervous structure, upon the motor centers of the cerebrum. We must understand that the resulting consciousness is of only the objective thing, or fact, or problem..

The aggregate of these feelings produced by molecular nervous motion in an organism, constitutes its mind. It will be perceived, that this definition includes all organisms, having nervous systems. In fact, late experiments, and investigations tend toward proving, that the functions of nerve matter and those of ordinary muscular tissue, are in no way different in kind.* The only advantage to the organism the nerve tissue gives, is the greater rapidity, with which it conveys sensations, and produces responses, or reactions. The nerve tissue in the human individual is so large a part of the organism, that its activities include abstracting, discriminating, and comparing the qualities, and the meaning of sensations in a very much larger degree than in any of the lower forms of life. But the animal with or without nerves, and the members of the vegetable kingdom, have a degree of "mind."

"I know of no test, by which, the reaction of the leaves of the Sundew, and of other plants, to stimuli,

* "Physiology of the Brain," Jacques Loeb.

so fully, and carefully studied by Mr. Darwin, can be distinguished from those acts of contraction, following upon stimuli, which are called 'reflex' in animals." T. H. Huxley, page 171, *Essays, "Animals and Plants,"* Appleton edition, 1896.

Alfred Binet in his "Psychic Life of Micro-Organisms," says, that Moebius recognizes, that psychological life begins with living protoplasm. The pseudopodia, therefore, have mind, although there is no trace of differentiated nerve structure. In this sense mind is coextensive with life. Haeckel says it is not confined even to the organic. The original atoms, that make up the entire inorganic as well as organic nature, themselves have the function of motion, attraction, and repulsion. To the extent that these atoms respond to their environment, they have minds, and knowledge. In short, all such responsiveness, whether we call it attraction of gravitation, chemical affinity, molecular motion, or psychical phenomena, is, in one sense, simply mind in different forms. This is the doctrine of continuity of consciousness. The degree, or intensity of it, depends upon the complexity of the aggregation of atoms producing the responsive motion. The atoms composing oxygen, when they leave their combination with hydrogen, and rush to embrace the atoms composing potassium, so impetuously as to produce fire on the surface of water, is not a conscious process, in our conception of human consciousness, but the result,—the phenomenon of incandescence, and the formation of a new compound, different from either of its constituent elements,—is clearly as wonderful, and as important, as the movement of similar atoms in the human brain, that result in only muscular motion, or what is called "will power." The two

processes do not differ, in being the interaction of matter and motion; and that is all we can perceive mind to be. In only a less degree also, these chemical phenomena in the inorganic world, have their subjective and objective phases. Units of inorganic substance, or of organic compounds, combining in the course of evolution, or disintegrating in the process of dissolution, appear to know, or to be conscious in a small degree of the proper motion to make in harmony with the pending phenomenon. Theology locates the consciousness in these movements outside of units of substance. But that is an assumption, not justified by the facts. This is their subjective side, and while it is very limited compared with our conception of the same phase in the human organism, yet we are compelled to recognize its existence. So, it is intelligence when the component parts of a star, brought by a ray of its light, pass through a lens, and form a spectrum, informing the astronomer of the composition and conditions of a far-off sun. These star components do this, whether there is any astronomer to interpret them or not. They did it millions of years prior to the birth of Fraunhofer and Kirchhoff, who first properly conceived, and interpreted their meaning.

These statements may appear teleological in that attributes are given to matter and motion analogous to those of the human being. But, that is not the meaning of either "design" or "teleology." The ordinary meaning of these words is, that a personality is behind the phenomena directing the movements, toward a certain preconceived end. My meaning is, that the movement results in effects, so in harmony with our ideas of the fitness of things, that it is a part

of a universal movement which includes mentality. There is no design, nor teleology in any of it, so far as we can perceive.

The term "psychical" has been limited to the activities of the human nervous system, and the analogous phenomena in the inorganic are termed physical. But the cause, and the effect, in both activities, are similar. If at the moment of the discovery of a great truth, like the attraction of gravitation in the brain of Newton, the bony covering of his cerebrum could be removed, and the most powerful microscope applied to the operation going on, nothing could be discovered, but the isomeric molecular motion of the units of matter composing the brain. All mental phenomena, however obscure, and however valuable, are simply the product, so far as experiment can apply, of the interchange of matter and motion, going on in the nervous structure of the body. Particles of matter therein are constantly disintegrating, and other particles forming new units. This activity accompanies every thought. The more rapid, and intense, the mental action, the quicker becomes the integration and disintegration. When the matter ceases to act, the differentiated energy called mental process stops. No one has ever been able to show by induction, that any human mental phenomena have been produced, except in the neural centers of the organisms, following and seemingly the result of, physical pulsations.

There is no apparent line of demarcation between the physical and psychical, as there is none, also, between matter and motion.

The mentality of living bodies below man is not different in kind, but in degree. If it were possible to dissect the nervous systems of man, and of a lower

animal, and exhibit them apart from the body, upon manikins, so as to show them in all their ramifications, just as they lie in the organisms, they would show, by comparison, that the superior mentality of man results from the more complete, and perfectly connected network of larger nerves, permeating every point of the human body, and all connecting in the larger and more complex ganglion, called the brain (there are about 3,000,000,000 neurones); while the same system, in lower animals, is less complete, and more disconnected at its peripheral, and other terminations, and less complex, and of much smaller size in the encéphelon compared with the size of the body; that the nerves and ganglionic centers, including the brain, are larger, more copious and complex, giving them higher quality just in proportion to the manifested mentality of the organism. This would be the natural and effective method of teaching psychology, and nerve physiology.

When man is confronted with the unknown, and desires to and can scientifically make it known, his method is the same as that of the animal. He simply makes repeated effort, until he finds a solution. I am now referring to the manner of procedure only, not to the immensely larger number of higher problems man is capable of solving, of which the lesser mind, of the animal, is incapable. The difference is one of degree only, and the same method practically being adopted by both, under the same necessity, proves the homology of structure and function.¹⁶ That is, they have the same psychical device for accomplishing their necessities, the man's being greater in power and complexity only. There is little doubt, but that at one period of man's evolution he did things just as

the animal now does, and could not do any more, or any differently. The difference, between him now, and then, is an evolution of the same structure and function, he then possessed, not the elimination of that and substitution of other of a different kind. All life is akin, because it is evolved from the same material, without the addition, or subtraction, of a particle of its essence, quality, or nature at any step of the process. That is the reason why structure and function are alike in kind and differ only in degree.

The present experiments that are being made in aerial navigation show very clearly the parallel working of the psychical device in man compared with the same device in the lower animal, when they are both confronted by an unknown problem. So do the efforts made to reach the north pole. It is a series of trials and failures. It is the reaction of the nervous structure to an objective stimulus in an indefinite unco-ordinative way. The induced nerve molecular action is without any former experience in such line of action, and the line of least resistance for such response is not yet found. Like the baby learning to walk it is very hard work at first, but with the prospective result that eventually it will become as automatic as the flying of the bird.

Consider further the comparative daily life of man and that of the animal. Men seem to have done and are now doing instinctively those things that are concrete and are not beyond their capacity. The great bulk of organized society confine themselves to agriculture, commerce, manufacturing—to money making in general. All these pursuits have reference to the support, housing and adornment of the body and require the least amount of brain energy. That is, the

great bulk of the people are spending their lives in doing in a little higher degree, just what the lower animals are doing in a less degree.

An animal's existence in the wild state is a struggle, that is, an effort for existence only. If he can get enough to eat and defend himself from his enemies, that is the sum total of his life. The man who gives himself up to industry or business does practically the same thing. His brain, of course, is very far superior to that of the animal. But that extra brain, the difference in nerve structure between him and the animal, he devotes, as a rule, to higher quality of struggle for higher existence only. The philosophy of life, the science of religion, the relations he bears to the forces of his environment; he hands over to a spiritual leader and refuses to think about them. The animal hunts and grazes; the man cultivates the ground for his vegetable sustentation and selects his animal food by domestication. The animal wears the dress that grows upon his skin, the man selects his material and manufactures clothing. The man makes a fire and cooks his food. The animal as a rule (there being some exceptions) dwells and sleeps in the places he finds at hand without any contrivance or mechanism on his part; man builds himself houses of some kind in which to live. The animal changes localities on foot or wing or by swimming, man subdues beasts of burden, builds vehicles, utilizes the natural power of heat or electricity to carry himself, his food and clothing from place to place. These differences in the methods of bipeds and quadrupeds are largely the result of man's acquired erect position. This acquired function modified the anatomy and physiology of the whole human organism. The arms became shorter

and unadapted to an arboreal life. The hands retained their prehensile power, but the feet lost their power of grasping the limbs of trees. The feet gradually flattened on the soles and calves developed on the lower legs, adapting them to support and steady the body in the upright position. These changes contributed to the better defense from enemies and the power to capture other animals for food, by throwing a missile with steadier and surer aim.

The upright position also gives a longer reach to vision and must have modified the anatomy and hence the physiology of the lungs and throat. In my opinion it made possible articulate speech. I cannot verify this anatomically. But it is scarcely possible that if man had continued to the present time a quadruped, he could have acquired the function of articulation of words in the way words are now used. The modifications that took place in the anatomy of the human being after he assumed the upright position by the laws of correlation reached the anatomy, and through that the function, of every organ and every part of the body. The muscles of the throat and neck must have been profoundly modified, because the forelegs which by the erect position became the arms, are attached to the body so near the neck. It is most probable that the modifications that eventually occurred in the throat and lungs were followed later on by the power of articulation, which prior to such changes was not possible. The freeing of his hands from mere aids to locomotion has also enabled him to contrive and construct.

He gradually acquired the power to record with those free hands a written language to represent the sounds of his voice and the images made upon his

brain by objective things, by which any advance in the methods of the struggle for existence can be permanently communicated to his fellow men, not only to his own generation, but to those of the future. The result has been that in addition to the former communication of new ideas and facts by direct contact and personal observation, distant peoples are rapidly informed by books and periodicals of all new methods and discoveries. The art of printing has thus given an immense impetus to man's efforts over those of the animal in the struggle for existence. But notwithstanding all this it is well to observe that the men who use all these advantages that man's enlarged brain power has given him over the wild animals, who still use the primitive means of existence for the mere support of the body, are still on a level only with the animal in the objects of his life. They accomplish the same object, only in a human and more complex way. The human way of sustenance and clothing is better in quality only. It has a better effect in prolonging life. The human generally, not always, dies a natural death, the animal seldom, and Seton Thompson says, never.

Do not these facts lead logically to the conclusion, that the mental life of man differs from that of the animal, in degree only, not in kind?

"We shall regard all the operations of consciousness—all our sensations, all our emotions, and all our acts of will—as so many expressions of organic adaptations to our environment, an environment which we must remember as social, as well as physical."*

"Comparative anatomy, comparative physiology and

* Psychology, by J. R. Angell, p 7.

comparative psychology all converge upon another cognate principle, i. e., that the development of consciousness among various genera and species of the organic world has been parallel with the development of the nervous system." *

"The elements of our knowledge ultimately reduce to sensory activities for which the immediate preconditions are specialized sense organs and a central nervous system.

"The whole significance of the different stages in the cognitive operation is found in the devices they represent to further the efficiency of the motor responses which the organism is constantly obliged to make to its environment. Memory, imagination and reasoning are thus simply half-way houses between stimuli and reactions which serve to permit the summoning of just those movements which the present situation demands, when interpreted in the light of the individual's past experience." †

As many sensations received by the organism, do not reach the highest and largest ganglion of the nervous system, the encephalon, but are co-ordinated by the smaller ganglia, located in the various parts of the body, it follows that the popular idea that the brain is the sole seat of the mind, is erroneous. The cerebrum is, however, the seat of what is known as intellectuality.

"The intelligence, the higher affection processes and the compound voluntary actions are conditioned upon the integrity of the cerebral hemispheres." ‡

* Same, p 13.

† Page 256, Angell.

‡ Wundt, p 284, "Principles Physiological-Psychology." Vol. I.

The nervous structure permeating all parts of the organism and producing feelings in every part may account for the evident failure of the earlier phrenology to localize mentality in the brain alone. I know it is claimed by Prof Karl Pearson that size of head is not correlated with intelligence. But whether he contends that this should mean that the number of neurones, or of neural arcs in the animal system, or the cross association paths in the cerebrum, connecting the sense centers: or the actual size of the encephelon compared with the size of the body; or rather its weight in proportion to body, and the actual extent of the convolutions of grey matter in the brain; that none of these correlate with intelligence, I have not ascertained. The elephant has a larger mass of brain than man, but not in proportion to the size of his body. His intelligence, humanly speaking, does not approach that of man. The difference, therefore, between the mentality of man and that of a lower organism may be one of quality more than of quantity, just as the fine wood, and workmanship of a Stradivarius violin produces finer tones and harmony than those of the common instrument. Yet there is a perceptible difference in quantity, not only in size, but also in numbers of fibres.

Every obvious feature, of the organism, is some expression of the mentality, or character of the individual. And, therefore, to a certain degree, there is an adumbration of truth in the claims of the various advocates of special localizations, that the shape of the head, the physiognomy, the palm of the hand, the hand writing, the voice, the walk, all show character. But the interpretation lies in the combination of all external peculiarities of the body.

Phrenology assumed too strict a localization of function in the cerebral centers. Every psychical phenomenon is not only the result of the sensory excitation of its appropriate center, but is contributed to by other centers connected by cross associative conduction paths. If the appropriate sensory center becomes, more or less, abrogated from any cause, other centers, in time, vicariously assume and perform its function. Therefore the strict localizations of phrenology are illusive.

The structural neural centers furnish fixed nodi in which functions operate in a very variable, and unstable way. The processes, while of course determined by what are termed material structures, are so modified physiologically by the association fibres of conduction, crossing and mediating the sensory and motor centers, permeating every part of the brain structure, that they must not be considered localized in the sense of the old phrenology. It is probable that the higher in the brain the locality of neural function, the more universal are the contributions by all parts of the conduction paths, beginning at the periphery, running through the myel, the oblongata, mesencephalon, diencephalon, the cerebrum, and ending in the various association centers of the prosencephalon. Psychological abstraction and generalization evidently occur there, and they are the effects of the most complex functions, of parts of the brain structure, centering in the cerebrum by the cross association fibres.

By bearing in mind, that the above definition of knowledge gives it two essential co-existent, or sequent parts, which might be called obverse and reverse sides, or better still, scientifically, the objective and subjective; the absence of either of these essen-

tials accounts for the unknown, while the two, acting normally, psychologically together, constitute the known. It is obvious that if the first essential is absent, namely, the objective, there can be no knowledge "Whatever it is possible to take interest in, whatever it is possible to describe, whatever it is possible in any way to apprehend or think about, to remember, recognize, forget, consciously identify, anticipate, intend, or mean—any such thing is a mental object." Page 41, "Thoughts and Things," by James Mark Baldwin. So the absence of the second element, which may be defined, as the co-ordinating process occurring in the encephalon in its correspondence between the internal nervous centers, and the external relation of things in the environment (meaning by the environment, all causes of sensation), would surely result in want of knowledge. The subjective is really the molecular motion of the structure in the brain that receives the sensations and co-ordinates them into ideas. There is no way to examine it empirically, while the process is going on, and if that could be done, it is more than probable that all that could be discerned, would be physical motion of the molecules resulting in more or less decomposition and releasing stored-up energy. Could observation of the molecular motion of the brain molecules be made, in such way as to show the forms and directions accompanying each psychical explosion (mental phenomenon) the laws of the latter might be formulated therefrom, in the same manner that Kepler formulated his laws of planetary motion from the molar motion of the planets. But it is plain that such observations are not practical. Notwithstanding this fact, it is a mere arbitrary assumption to contend there is anything more in men-

talities than molecular motion, or metabolism. For example, the want of this power of co-ordination in the brain of man, prior to the discoveries of Copernicus, kept men in ignorance of the true motions of the stellar bodies. The objective fact existed, but not the subjective correlative molecular motion of brain structure. Therefore there could be no correspondence. The channels of this correspondence, in higher animals, are the five senses of sight, touch, hearing, tasting, and smelling. "Nothing is in our mind which has not been before in our senses" is an old saying.

This correspondence of the exterior with the internal nerve centers, is the process of mind-making in its simplest terms in the new-born infant. The infant at birth possesses the potential neural structure essential to this correspondence; but has no knowledge, until experience establishes certain relations of space, time, quantity, and quality, to which the mind can refer all successive sensations as they arise. To me these experiences are the rearrangement of the molecules of certain centers of the brain which produces the conception. This complex movement of structure constitutes the idea, and the latter passes away when the pattern of moving molecules is transformed to other patterns. The reformation of the same idea is the reformation of the same pattern on the tissue of the brain.

Of course, the process of the evolution of intellect, or abstract generalization in man, is extremely complex and involved. This comes only with years of experience. The sensations that go to the complex patterns of the cerebrum, where the data of experience seem registered, that is, all the associative centers, are finally co-ordinated with these data of experience into

memory, judgment, and will. It is not the function of the brain or central innervation to "store up" ideas or sensations. But a stimulation, often repeated, changes the more stable molecules of the nerve cells to less stable ones, and thus increases the potential work,—the accumulation of what we call psychical processes. When this potential accumulation is released into actual work, the product is the more stable molecules, and the psychical phenomena called, e. g., memory, or imagination. Thus there is always going on in the nerve structure a change of the chemical composition of molecules resulting in either potential or actual work. These physiological functions are the psychical phenomena of thought and feeling. Herbert Spencer says: "An idea is the psychical side of what, on its physical side, is an involved set of nervous plexuses. That which makes possible the idea, is the pre-existence of these plexuses, so organized that a wave of molecular motion, diffused through them, will produce its psychical correlative, the components of the conception, in due order and degree." So that it follows, that the difference in ideas expressed by different organisms, depends upon the organic structure of the nervous systems, and not upon a separate and distinct mental entity, that may be supposed to exist within the body. Mind is not matter, nor spirit, therefore, but a condition, and is psycho-physical. "Psychical" means the effect produced in the motion of molecules of nerve tissue in the body, in response to some incidence of force from without, such as light, heat, sound, etc.

"We now know that each act of the will is as fatally determined by the organization of the individual, and is as dependent on the momentary condition of his environment, as every other physical activity. The human will has no more foundation than that of the

higher animals, from which it differs only in degree, not in kind."*

"Free will" is clearly a limitation of the theological idea of "divine omnipotence" It means the power of the individual to do something which neither "God" nor the physical forces can either do, or prevent.¹⁷

The sensations received through the senses, from the objective, are the primary sources of all knowledge and mental development. But before there can be knowledge there must be hereditary structure in the organism, whose function is the co-ordination of these sensations, into what we call knowledge. The quality, and scope, of the knowledge depends upon the structure. The quality, and within limits, the quantity of the structure determines the limitations. It may with truth be said, that the real difference between the mind of Shakespeare, for example, and the lowest man, lies not in education in the schools, but simply in the difference between the structure, and quality, of their nervous systems. Of course education in schools is of very great importance, in giving the growing organism experience of the highest value in the future interpretation of the problems, always presenting themselves for solution in life But, unless the brain structure exists, there can be no education; and the degree of its efficacy depends upon the quality, and power, of the structure. In walking, I have a stride peculiar to me, and wear my shoes, at certain places on the soles, different from other walkers. What causes these peculiar differences? It is the anatomy of the bones and muscles of the legs peculiar to me. On account of this anatomy, it is

* "Riddle of the Universe," Haeckel, p 131

impossible for me to walk in any other manner. The physiology of the organism in every part depends in the same way upon the structure. The outer expression, in the body movements, are all determined by the anatomical structure, so are the outer expressions of the nerve physiology determined by the ganglionic neural structure. They are predetermined, by the anatomy, and the personal differences, of individuals. Both the physical and psychical expression have for their basis the variations in personal anatomy. The differences in the anatomy of the bones and muscles, and the consequent variations of their outer expression, are much more apparent to the senses, than are those of the nervous system. But the same law, of interaction of structure and function, governs both; although the subtlety of the psychic, on account of the extreme mobility of the neural structure, and its location in the body beyond ordinary observation while life lasts, make it appear to the indifferent observer to be predetermined by a different law. In principle there is no difference between the equilibration of structure and function of both.

Why Helen Keller has succeeded in knowing the relation of so many objective phenomena, through the sense of touch almost alone, is that she was born with a finely organized nervous structure adapted to all five senses, which responded, by the associative brain centers, to sensations of touch. The auditory and optical centers existed in her brain the same as in the brains of those who have these peripheral sense organs. While these centers are not excited in the same way they would be by normal eyes and ears; yet they are not dormant by any means, in producing, by association, very much of the contents of

her consciousness,—her correspondence with environment. Her visual brain center is excited, not by sight, but by touch, and thus she has a mental vision. It would have been very different had she been without the neural brain centers of sight and hearing. She is wanting only in the functioning of these peripheral sense organs, not in the brain centers of them.

Educational institutions can only place the neural structures of the students in contact with a superior environment. In other words, education consists, or should consist, of repeated presentations to the sensory nerves of the most important objective truths, with which the nervous structure, by constant practice, can establish correspondence, and build up a method and memory. This is usually done by means of printed books, containing the best ideas, and by oral lectures conveying the most important objective truths. But the daily observations of natural phenomena in physics, psychology, biology, sociology, and ethics by induction are the main sources of desirable education. Each student brain responds to such environment, in proportion to the brain's quality and intensity. A certain tonic is thus given to after psychical processes, and those neural associative centers greatly strengthened, which produce what is popularly called reason, imagination, and will. Memory consists of the readiness, and power of the cross associative conduction paths, to recall and the will, the power to apply, the images thus made, in all the psychical processes of after life. "Reasoning is a synthesis of images" by the following process. For example, the individual sees a funeral pass along the street. The image of it is instantly formed on the optical center of his brain, and there it evokes, by associa-

tion, the memory of numerous other funerals he has seen, and what he has read, and learned, upon the subject of death. These like images fuse into a general image, viz., that all men will die, therefore he will die. Without the former experiences of the same, or similar impressions, he could not have thus concluded. A child gradually attains a knowledge of likenesses and differences,—all the relations that common objects bear to each other, by the constant use of sight, touch, hearing, taste and smell. Upon the experience thus obtained his powers of mentality, in after life, are gradually developed. The limit of these powers is fixed only by the physical complexity of his nervous structure,—those plexuses through which ideas are formed. Each idea arises out of former ideas, and gives birth to new ones. The structure, and quality of the higher organism are the result of what Darwin calls "Variation," brought about in some way, perhaps in various ways, and principally by the laws of heredity not yet fully comprehended. The variation in structure, that enables one man to comprehend more numerous and obscure facts, and by virtue of former experiences, commonly called education, to draw more accurately the correct conclusions from them, than another man is capable of doing, is what is called the better mind. The ampler this responsiveness, the greater the knowledge. The known to him, is just what his nervous structure enables him to absorb from the outer realm, and co-ordinate into ideas. The domain of the knowable, is just in proportion to the development of this correspondence. Thus structure and function go hand in hand. They are simultaneous in development.

The colored children in schools are said to be quite

as apt in the elementary studies as the white children, and in many cases, more readily absorb the teachings. But when the higher branches are reached, the white children usually leave behind the colored ones. This is explainable, only on the theory of evolution, that function and structure proceed simultaneously. The ancestry of the white child for innumerable generations have been surrounded by a civilization that necessarily resulted from a superior nervous system, and especially those higher qualities of the brain called intellect. What produced the variation of larger cerebrum, and of better quality in the structure of the brain, of the white man that eventually produced his superiority as a race, is not necessary to discuss. But it is a well known anthropological fact.

This fact of the simultaneity of structure and function is essential to organic evolution; because mentality or consciousness is a condition produced by structure and an awareness of relation. The superior form of the matter making up the organism of the white race, and inherited from generation to generation, must have come originally as a variation from such structure in his ancestors by reason of the peculiar incidence of natural forces in his immediate environment, very likely by the superior sustentation, as Weissman believes, of the procreative cell. We infer, therefore, that the white race's superiority to the black race is the result of the natural selection of more numerous and important variations of neural structure occurring in that race, brought about probably by a more highly complex form of sustentation.

Says Frederick Engels, in "The Origin of the Family," a book containing much important information: "The superior development of Aryans and Semites is

perhaps attributable to the copious meat and milk diet of both races, more especially to the favorable influence of such food on the growth of children." This refers to the period of the lower stages of barbarism, in the evolution of these two races, when they began the taking of animals for domestic use. Thomas H. Montgomery, Jr., in "Analysis of Racial Descent in Animals," page 146, says. "Our conclusion is, that variation progressive, or regressive, and also mutation, in fact, any inherited modification of the race, is instituted by stimulus of the environment," an environment remote as well as near. Though Darwin held that variations were the results of "inherent tendency," more than of environment. But it is likely that this "inherent tendency" originally arose from sustentation. The term "inherent" must be interpreted, not as something given supernaturally, but as an unknown cause. No evolution takes place independent of environment, for always there is at least an assimilation of matter from outside the structure. This is as true of the germ plasm of the germ cell, as of the cells going only to the formation of tissue. This is the view of the Neo-Lamarckian school. There is no evidence of a "perfecting principle" in the germ cell, as claimed by Nageeli—"prophetically determining descent with modification."

There are no "inherent" tendencies in matter to assume consequent forms, or tropisms, or tendencies, "inherent" meaning something implanted therein by an ultimate unknowable cause. It is always response to a stimulus, of what is called an environment, or something beyond the body of the thing acted upon. For example, there can be no change in the anatomy or physiology of an organism, unless it is a reaction

to an external stimulus, such as the assimilation of food, and the reaction in an organism is always different from stimulus in form.

Therefore variation is not produced by an inherent tendency; but probably by a change in the sustentation of the substance of the germ cell through the cytoplasm. The growth energy changes the matter absorbed to something different, and sends it back to the cytoplasm. These environmental influences include the stimuli of the tissue cells upon the germ cells, the tissue cells having become specialized, in different parts of the body, and produce the peculiarities of the individual. These peculiarities react upon the chromatin of the germ cells, and thus affect the subsequent chromosomes. The result is, that some acquired characters become hereditary. The question is, which ones? All characters now congenital have been at some time acquired (Cope, 1896). "Inherited variation results from the interaction of external influences, and energies of the chromosomes." Montgomery—"Analysis of Racial Descent in Animals," page 146.

The energy retained in the organism, that is not dissipated in its growth and development, by its integration, is function. Psychical function is the continuing adaptation of the organism to relations in its environment. It is the perception of phenomena, by the continuity of images perpetually produced, by the patterns of the brain. As this adaptation enlarges, and becomes more complex, it is necessarily accompanied by an enlarged and more complex structure, of the matter of the organism. The two conditions are inseparable.

Considering the first formation of a nerve in the course of biological evolution, as the beginning of a higher quality of mentality than that existing without nerve structure, it was of course a variation favorable to the organism, in its struggle for existence. Natural selection would perpetuate this favorable variation, and its progeny, inheriting the variation, would naturally be the ones to produce eventually another, and still other variations, of more complex nervous structure. The survival all the time of the best adapted, or the fittest, would end in a superior human psycho-physical unit.

If this is the true theory of mental evolution, it becomes at once apparent, that, the great variety of intelligence, or mentality, we see in animal nature, has been caused by the simultaneous variation of structure, and of the function thereof, in all the innumerable organisms of every line of descent, in the organic kingdom.

For example, two blades of grass, almost side by side, will often show a great difference in growth, because the rapid growing one happens to be in contact at its roots with a richer food, than its near neighbor, this richer food being a part of its environment, and immediately its function, to take in more and more sustentation, grows simultaneously with its parallel development of root and stem structure, until it overshadows its puny neighbor, whose structure remains adapted only to its function to take in the smaller, and less nutritious sustentation. This puny blade lacks the environment of richer food of its more fortunate neighbor. The former produces large and vigorous seeds, in correspondence with its larger function of sustentation; while the seed, of the weaker

blade, will barely germinate at all, and perhaps dies out. But the difference between the successive generations of the two blades of grass, for all the time they may exist, is caused by the habits, or functions begun by the two original blades, the difference of function producing the visible difference of structure. Weissman's theory of heredity includes just this principle of variation. He seems to think variation is the result of the larger difference in sustentation received by the biopher, producing the variation. In a forest there are a few magnificent, lordly trees to the acre. The original seedlings stood as many to the square yard. The difference is accounted for by the deadly struggle for existence. Those that have survived are the ones that had the better correspondence with the environment and are the survival of the fittest. It is thus throughout the realm of nature.

So with the higher organism called man. His superior mentality has been evolved as part of, and simultaneously with, his superior physical organism. His nervous organization, composing the avenues by which molecular motion, producing that complicated and obscure aggregation called the mind, is made possible, is the material, or physical registration of all the previous structure producing the habits, the peculiar line of action, in other words, the function, of all his ancestry back to the beginning of cell formation, from which originally his life began.

When the variation, in nerve structure, occurred, which differentiated man's ancestral line from that of other animal forms, it probably occurred in the same way essentially that the variation did in the blade of grass above referred to. It was entirely material, and natural, in its cause. Its capacity for producing sub-

sequent favorable variations in the line of human evolution was at that time established. Every successive organism, of this ancestry, inherited the essential structure and function of its predecessor. Occasionally one would show a variation favorable to its struggle for existence, which also became inherited; and the added function of this variation became, also, inheritable, and thus the present human organisms, on this globe, are simply the organized registration of the habits and peculiarities of all of their ancestry, back to the beginning of life. The process has undoubtedly been exceedingly slow.

No two members of the same species even, are alike, because no two have occupied just the same space, and therefore could not have exactly the same correspondence with the relation of things, or objects in the environment. This difference of correspondence with environment constitutes the difference in species, as well as the individual varieties, natural selection having perpetuated the favorable variations. Says Spencer, Vol. 1, p. 197, "Psychology": "Besides concluding that in no two species are the subjective effects produced by given objective actions absolutely alike, qualitatively and quantitatively; we may conclude that they are absolutely alike in no two individuals of the same species."

Nervous structures may be compared to an Aeolian harp, which produces beautiful music, when the motion of the air strikes its chords. If the correct arrangement of the strings exists, the harmony is produced. The quality of music depends upon the structure. The higher the structure of the instrument, the higher the class of music. The same air, blowing on different structures of harps, produces entirely differ-

ent classes of music. So the quality of thought, in man, is determined by the structure of the nervous system. Says Spencer, p 195, Vol. 1, "Psychology": "That qualities being alike, the quantities of the feelings produced by given agents vary with the specific structures, is a familiar truth." If the structure adapted to respond to the higher and finer qualities of sensations, transforming these into percepts and concepts, is not there, there will be either no response, or an abortive or inharmonious psychical reaction. This high structure was in Shakespeare, and in fact, in all the great thinkers; and was so responsive to the most acute and truthful sensations coming to it from the highest harmony of objective relationship in the environment, that the thoughts Shakespeare produced are among the most satisfying that have been perpetuated in written language.

Why did Newton see the significance of the falling apple, while other men, with brains and nerves apparently like his, failed to make such an important discovery? It must be, because there was a small structure (a variation), of grey cortex in his brain, lacking in other heads, that responded to the sensation coming from the falling apple, through the optic nerve upon the optic center, forming a series of successive images, impossible to the other brains. These were memory images of innumerable past sensations of falling bodies, and of astronomical bodies revolving in apparent circles, and of Kepler's three laws. The fusing of these images on his brain cortex produced the concept, or abstraction, of the great principle of the attraction of gravitation. This might also be the answer to Huxley's question, put to himself, upon reading for the first time Darwin's "Origin of Spe-

cies, "Why could not I have drawn the same conclusions, from the same well known facts?" The point is, that all of Shakespeare's and Newton's contemporaries were in the same environment, but could not interpret it as these two did, because they lacked the brain structure.

How this peculiar structure of grey matter came into Newton's head, and not into other heads, is the momentous question. But I suspect, if the habits and environment of his ancestors could be minutely traced, this peculiar variation, or differentiation, of brain structure could be easily accounted for on the principle of evolution. It would be exceedingly interesting, and most instructive, if we could trace back the line of man's evolution and discover empirically the causes of the variations in the organic structure, that first started the lower order manward. It is beyond the reach of scientific induction, but I have given above my view of it. It is said by one, who calls himself an idealist, that this is "gross materialism." He knows very well that his supposed maker of ideas, his "spiritual entity," cannot express a single idea except through the brain. Is the latter any less gross than the former? Is monism any more gross than the theological conception of a literal heaven and hell ruled by personalities having human attributes?

Some author has said no new cells are added to the brain between birth and death; if this is so, a superior structure must have been inherited from Newton's ancestors, and other important variations must have appeared first in his own nervous structure, at birth. What we commonly call greatness is most likely produced in the same way. Classical literature, and sci-

entific discovery, are the results of high structure responding to high environment. The brain cortex of a genius produces an image of obscure qualities of objective things, that common brains cannot produce; just as the fine French mirror reflects a more perfect image than does the common mirror made of defective glass.

The Anglo-Saxon brain will respond to a very complex environment, to which the nervous system of a descendant of a long line of African ancestry is incapable of responding. Hence the difference between the two, in the capacity of receiving higher education. But in those habits that have been common to the ancestry of both, such as production of the means of sustentation, procreation, muscular power and endurance, and all the ordinary activities, there is but little difference. So little seems to be known about the law of inheritance and variation, that it is perhaps better to say that the habits peculiar to an individual are not inherited, but the structure that produces race habits is, and when that structure is placed in correspondence with the same environment of its ancestors, it will respond in the same way, and develop the same habits, the variations producing new correspondence, unknown to the ancestors.

The paucity of our language, in words adapted to express the shades of scientific meaning, is illustrated by the fact that the definition of knowledge is practically the definition of life, evolution, and all natural phenomena; and the two are given frequently in the same language, viz., the continual readaptation of the subjective, and the objective. Not only the physical, but also what is called psychical, or spiritual, are caused by one universal force. The true definition of

one is the sufficient explanation of all. This is the unity of phenomena. The cognitive process is the operation, in unison, of the entire psychical device, and that is the nervous system.

The same truth will apply to the whole human organism, and what we have been heretofore calling the attributes of it. The embryo, especially its nervous structure, is at first indefinite, incoherent, irresponsible. It grows by the absorption, or integration, of matter from its environment. It could not survive without this correspondence with its sustentation. The absorbed matter builds up into a definite complex structure, the bones, the muscles, and the nerves. The different parts of the body retain certain motion or energy, but in different forms. But these different forms of motion, which are called function, are in their origin and nature all the same. The motion of the muscle is simply the dissipation of a part of its matter, and the renewal of it, by integration of the substance constantly taken into the stomach, and lungs. In the same way the function of the brain is performed, whether it is the exercise of what we call memory, which is the reproduction of former presentations, or the production of the highest thought in the formation of ideas. It is only a change in the form of the matter composing the nerve tissue, and renewing the destroyed form, by the sustentation taken from the objective environment, by the stomach and lungs, or in other words, molecular motion.

Thus the cognitive process, the process of life, and the principle of organic evolution are all covered by the same general definition, viz., the continual readaptation, or readjustment, of the organism with its environment. I watched the operations of a gang of work-

men, laying the concrete substratum of an asphalt pavement, in a street. There were twenty of them, and a concrete mixing machine run by steam. One man kept up the steam and controlled the engine. Another worked a lever, and dumped the mixed concrete into each wheelbarrow, as it came under the dumping box, the man handling the wheelbarrow taking it to the place wanted, where other men spread it over the surface of the street. This concrete was composed of sand, broken slag, and cement in certain proportions. These elements were constantly being placed into the box of the mixer, very rapidly, by a proportionate number of men shoveling the sand and slag. A less number of men carried from the sidewalk sacks of cement, and these were emptied into the machine at the proper moment, through a hopper at the top, by one man. One foreman controlled the operations of the men, and the machine, so that no time was lost, and no mistake made in the mixing of the right proportions of the concrete; and that the concrete was wheeled to the right place, and spread upon the surface at the prescribed grade and thickness. The materials, sand, slag, and cement, had been previously hauled in wagons, and dumped at the proper places, and the machine had to be located at the proper distance from the work of spreading, so as to economize the operation in both time and space. All the men worked at the same time, each doing only one thing. When the street was properly covered, six inches deep, with the mixture, the material was exhausted; and the work had been done with the most economical use of labor and material. This sort of simultaneous combination of a variety of effort resulting in the accomplishment of a unitary design is co-

ordination; and this is just what the molecules of the brain centers when normally working do every moment of the life of the organism in producing, by inhibition from the integration of matter and motion, certain psychical results, which we designate as thoughts, ideas, and muscular actions.

The common forms of muscular motion are so much slower and less complex; they are so much more apparent to our dull senses, than the rapid mobile action of the grey matter of the cerebrum, that it is not surprising that, to the latter, is attributed a supernatural cause, and to the former only a natural one. But the causes are the same, and only natural. A scientific study of the power and effect of light, heat, or electricity will convince the student that the operations of the mind are not exceptional, in either method, or result, nor practically different from other natural phenomena

The connection between the psychical and the physical is no more mysterious, than the connection between physical phenomena; for example, when two simple substances, oxygen, and hydrogen, come together in certain proportions, and form water,—a thing entirely different from either of its elements. So with the principle of chemical attraction and the attraction of gravitation. We do not know how a dynamo transforms motion into electricity, therefore psychical phenomena have no peculiar mysteries not found in other forms of motion.

These sense impressions are transformed images of real things objectively considered. Any irritation of a peripheral or sense organ is not felt in the brain, but the central organ sees, hears, tastes, or smells it at the location in the environment of the object producing the irrita-

tion. A pain is felt not in the neural center, nor in the threads of the nervous matter conveying the sensation, but at the point of the organism where the receptive nerve terminates. This may be any point on the external, or internal, surface of the body, but never in the ganglionic centers, nor in the motor nerves. When an arm is amputated, and one of the bisected, afferent nerves is irritated at the outer end left in the body, the feeling is not at the point irritated, but at the former peripheral termination in the detached part of the arm, or hand. So that consciousness is not an objective thing existing in the body, but a condition produced by objective things, through, and by, the neural structure, which is also an objective thing, in such way as to produce the object but not the subject. The cerebrum of the human being, or part of it, can be removed without pain. But its removal entire would destroy consciousness, although life and motor response would still continue, at least for some time. Hence we know that the processes producing consciousness proceed in the cerebrum.

What the limits of this evolution of structure and function may be is one of the unknown things. But it is safe to say that it will be controlled by the natural limitations of locality, and organic neural structure. As long as the organism is held by the indissoluble ties of gravitation to this earth, bounded by the little perceptions we can have from this point of view, even with all the aids of optical and other inventions, such as the spectroscope and photography, to assist the natural senses, we may reasonably conclude that such correspondence will reach but a very limited area of the unknown. However, all finite things, within the above limitations, that are capable of sci-

entific investigation will, in the slow process of evolution, if not already known, become so. Man advances in the knowable, however limited that may be, and just as he advances, his delusions about what is apparently unknowable fade from his mind. Among the monuments marking such advancement heretofore, it is well here to note the discovery, that all phenomena are traceable to one source,—the persistence of force; another great discovery is the unity of nature; and a few of the attributes of that unknown thing called matter.

Darwin, when he discovered the principle of evolution by natural selection, made a long stride (as it were) into the domain of the unknown, but not of the unknowable. He paid no attention to the “unknowable absolute,” nor to the origin of life, nor to that metaphysical enigma, the status after death, nor of the cause of variations in organisms, by means of which natural selection eventually produces species. It was a long time before even scientists would consent to exchange their belief in special creation for the more reasonable natural processes of evolution. They clung with great tenacity to the delusion of special creation. But the array of incontrovertible facts in the “Origin of Species” finally overcame their inherited prejudices, and now no prominent scientist, but accepts it, to some extent, and in some form. Since his time, however, and especially at the present time, very much attention is being given by scientists to the origin of life, with reference only however to its emanation from the inorganic, and the cause of variation, to the extent at least of brushing away its mystery, and its *noli me tangere* sacredness.

Weissman, while formulating a theory of natural selection in certain invisible determinants of the germ

plasm, does not pretend to account for the origin of the tendency of the biopher to evolve the variation, upon which natural selection operates to produce the structure, and while Professors Burke and Loeb are showing, by chemical combinations, that life may be produced eventually in the laboratory, from inorganic substance, yet they cannot pretend to experiment on the origin of matter, nor of energy. Life is undoubtedly a form of matter and motion, and, of course, all forms have origin, this being the only legitimate conception of the use of the word "origin" permissible.

Spencer further enlarged the knowledge of the natural, by showing in his "Synthetic Philosophy" that not only living organisms, but all phenomena in nature and society, dynamic and static, are the results of this same law of evolution, and that life itself, which by some is called a "vital principle," is only a differentiated phase of motion and matter, more complicated, and therefore only less discernable to the human intellect, than other aspects of this same matter and motion. In other words, it is natural.

Everything, called phenomenon, can ultimately be discovered in its phenomenal relation to other things, but the power, claimed by Spencer, to be behind, and producing the phenomenon can never be known because it does not exist. The historic origin of life will not be discovered; but either the mode of its arising from the inorganic will be, because it must be a phenomenon, of the interchange of matter and motion, perfectly apparent to the human senses, or its eternal existence coeval with matter will be established.

We do not need "noumenon" or "absolute truth" any more than we need an "absolute cause." Truth to us must be relative to our space and time. In

other words, as we are only relative beings, our knowledge, or truths, must be adapted to our conditions. Unconditioned, or absolute, truth would not be applicable to conditioned individuals. It is only what has a bearing upon our dependence on a material environment that can be known or be of use to us. Therefore the efforts to understand the absolute or unconditioned is not only futile, it is wasted, because if it could be successful it would not be beneficial. All talk about "pure reason" and "practical reason," in which by the former man cannot prove the existence of a final cause, nor comprehend the unconditioned; and by the latter that he must still believe in a final cause, notwithstanding his intellect is limited to time and space, or the conditioned, is an irrelevant talk and an illogical philosophy. It is not "practical reason" to pursue the unattainable, but to drop that pursuit and confine ourselves to that which reason teaches us is attainable and practical. This is the understanding of our needs in the obvious relations we bear to the real sources of our welfare, the physical and psychical universe.

Truth is the universe. There can be no absolute truth of a part separate from the whole universe. Everything is affected by every other thing and therefore cannot be correctly interpreted apart. There is nothing existing that does not fit into the whole and work with the whole. In this light only can it be a truth. The intellect of man cannot encompass the infinite universe, only a small part of it. Man's knowledge, therefore, is not of absolute truth, but relative only. He must be satisfied with this limitation of his knowledge. The term "self and not-self" is intended to represent the universe as one. Self, being

the individual, is a part of the monistic universe and the rest of it is that which is external to him; it is his environment. They must be interpreted together in order to arrive at the truth of either. The ego without its correspondence with "not-self" would have no meaning, and the latter without the self in relation would be without meaning to the ego. This is the sum of monistic philosophy.

With regard to the distinctive properties of living matter, Prof. C. Lloyd Morgan in his article on "Vitalism" (see "Monist," p. 196, January, 1899), says, "If by 'Vital Force' we mean the noumenal cause of the special modes of molecular motion, that characterize protoplasm, its metaphysical validity may be acknowledged, so long as it is regarded as immanent in the dynamical system, and not interpolated from without in a manner unknown throughout the rest of the wide realm of nature." I take this to mean that life is not a supernatural, but a natural phenomenon.

Every knowable thing has the relation of objective and subjective. In other words, only those things, facts, conditions, that impress themselves on the brain, in the form of images, enter into the experience of man. Such of these, as the brain can form a true conception of, are known. If this conception is made up of that which is true objectively, then the conception is that of a truth. But if the images are those of hallucination, and are recognized as such, by the receiver, then the knowledge is not of a truth, but of a deception, a subjective fact. The recognition is of the true nature of the image, and as-such is a truth. But if the brain does not perceive the delusive images, as such, it remains without knowledge as to these; that is, the individual is deluded. That was the condition

of all mankind regarding astronomy prior to Copernicus.

We can perceive that the same force that holds in place the innumerable globes, making up the stellar system, called gravitation, likewise holds together the atoms of which these globes are composed, usually called "cohesion" or "affinity," and that these atoms are everywhere the same, whether in the grey matter of the brain, the ether, filling all space unoccupied by substance, or the rocks, and debris of all globes. The different combinations of these make the great variety of effects apparent to the senses.

It will be only a repetition of the foregoing ideas to say that the difference between the knowable and the unknowable can also be expressed by the more popular terms of the natural, and supernatural. The natural contains both elements of the definition of knowledge heretofore given, the objective and the subjective; while the supernatural is deficient of the objective. It is purely subjective. It is what theologians call faith. Faith cannot be defined scientifically, because our senses cannot receive impressions from its object. It is want of knowledge. It is not cognized by science. Science is confined to the treatment of the natural. I do not mean by the term "science" a process confined only to the intellectual few. "Scientific method consists, in close observation, frequently repeated, so as to eliminate the possibility of erroneous seeing; in experiments checked, and controlled in every direction in which fallacies might arise; in continuous reflection on the appearances of phenomena observed, and in logically reasoning out their meaning, and the conclusions to be drawn from them." It is perfectly plain that this "method" cannot be applied

to the supernatural, because it cannot be cognized by the senses. The "eye of faith" is not scientific. It is purely subjective.

"A previously equipped mathematical mind, a wide reach of identifying force, and an indifference, or superiority, to poetical and fanciful aspects, concur in all the authors of discoveries, that bind the conjunctions of Nature in mathematical laws." Also, "Science is repellent to the natural mind, from the necessity of dissociating appearances, that go naturally and easily together, of renouncing the full, and total aspect of an object, whereby it engages agreeably the various senses, and of resting upon some feature that has no interest to the common eye."* That is, the brain of man has been structurally organized, or evolved, simultaneously with long generations of correlations of certain sensations coming from the most observable appearances of objects in the environment. Scientific observation by an occasional superior brain goes beneath these appearances, and receives its sensations from the more complex, and heterogeneous, and definite qualities; and combines these into a logical principle of general application. The unscientific mind, not having any structure of brain to respond to such complex sensations, is repulsed and therefore exhibits no interest.

Even Kepler, whose wonderful ability led him to the discovery of the now accepted three laws governing the orbits of the planets, was so saturated by inheritance, and education, with superstition, that he could not see how the planets were held in place, unless by a spirit at each star. His intellect was far

*"The Senses and the Intellect," by Alexander Bain, p. 518.

superior to that of most men of the present day. The inference is, that delusions fully as absurd must possess the minds of the present generation of the most intellectual men. But Spencer says, "As fast as experience proves that certain familiar changes always happen in the same sequence, there begins to fade from the mind the conception of a special personality, to whose variable will they were before ascribed."

There is great significance in the historical facts, showing the strange, and now well recognized, universal delusions which have pervaded all society, in all the ages preceding this. Those that are still existing may be grouped under the following heads, with many unmentioned subdivisions of these, viz.: militarism, monarchy, supernaturalism, capitalism, slavery, the general craze for riches. All these saturate Christian civilization. Other civilizations have still others, peculiar to themselves. Fortunately "Crusades" and "Witchcraft" belong to the past.

Delusions are not confined to the so-called ignorant. Sir Mathew Hale, though a learned judge of England, and the Mathers, though dominating Massachusetts intellectually, believed in witchcraft. Every delusion of the present day has its votaries among the so-called learned, and great; so that it has ceased to become a reason for the truth, that Gladstone, or Bismarck, or other so-called intellectual giants, are devotees or believers. They may be learned in many things, but be exceedingly ignorant, or willfully ignorant, of those things most important for man's real welfare.

"There probably never lived at any time in any country, a 'statesman' who was less scientific, who had less knowledge, and who relied so purely on

experience, and a sort of half-gambler, half-pedlar cunning, as Bismarck. In fact he never had any conception of the moving forces of political, and social life at all." Wilhelm Liebknecht Gladstone showed his utter lack of scientific method of thought in his controversy with Huxley.

It is well known, that the hobgoblin beliefs of one century are naturally classed as delusions by the next; although the beliefs of the latter are mere modifications of the former. This fact brings them within the operations of natural evolution, by selection of the fittest, and the dying out of the unfit, which is slowly bringing mankind nearer and nearer, age after age, to the truths of natural law. In other words, as man's nervous structure evolves into higher responsiveness to the obscure laws of natural cause and effect, his preconceived ideas fade from his mind. Man at present seems to be willfully, and woefully, ignorant. That he is slowly evolving into a higher correspondence with phenomenon, and its laws, is quite certain. To what extent he will, while confined to this earth (man being a late product of the persistence of force, that long ages before he was begun, produced the other apparent forms of matter), eventually know all the natural causes and effects accessible to him is a problem I am incapable of solving.

In the light of evolution these historical and other facts, as mentioned, teach some important scientific and philosophic lessons. They surely indicate, also, that the human intellect, or the human consciousness, is a growth, and not a creation. There is no indication either in human records, or in the anatomy and physiology of the human organism, that man was ever perfect; or that ever at any previous period of his race

development, he comprehended as much of his environment, and the significance of phenomena, as he does now. Induction seems to have been a late method in his psychology, and the primitive races seem now to know nothing of it, unless it may be in some unconscious process, in which the lower orders of brute organisms, are equally proficient. His power of abstraction, and generalization, has come only with the evolution of nervous centers, principally in the cerebrum. To these centers anatomists, physiologists, and most especially psychologists, have traced the intellectual power, by which he is enabled to lift himself in cognition of his environment, from his former delusions, into what now seems, by comparison, a state of very high correspondence with objective truth. But he still has his limitations, beyond which it is impossible for him to ascend. These limitations are determined by his nervous structure. ¹⁸

The important thing to the individual is to have the complicated machinery, upon which his mental life depends, in the most complete working power. He cannot change the form, or quality of it in his own organism, but can make what structure he possesses more efficient by education of the right kind. What ideas, and abstractions, it is capable of producing, in his consciousness, depend for their veracity very largely upon the view his own mentality takes of the machinery, and its method. The difference between true knowledge and delusion depends on this view. The old adage, "Know thyself," was largely intended to be confined to a study, and control, of the moral ideas of man. But since science has turned its attention to psychology, it means a study of mental organizations, and functions; for upon these depend a proper

comprehension of natural ethics, and natural religion.

These observations on the limitations of the human intellect are not those current in society. Literature is full of wonder, at the capacity of the so-called "mind." It is common to hear exclamations of "how wonderful it is that man knows so much"; to "what heights of thought, and imagination he can soar." But when we come to analyze this supposed knowledge, and compare it with what phenomena evidently still remain to be known, it is apparent that these are mistaken ideas. The efforts, and the thoughts of the coming intellect, should be given to the investigation of those now unknown things, that are within the knowable environment, and are of probable importance to man's welfare, as a denizen of this globe, and to his longevity therein. This knowable environment is that which is in reach of his special senses. It was little more than three centuries ago that one man perceived that there was some motion to this earth, and he was persecuted because he asserted that fact. In reality, man, while knowing more than other animals, is yet very insignificant, and knows little about the phenomena even of his insignificant abiding place. Some men, however, assume to know metaphysically both his origin and his destiny.

The fact is, that the sensory organs can respond to only a limited number of incident phases of the persistence of force. The eye, or retina, can receive sensations of light only when the vibrations of ether are of a certain length, and rapidity. The ear can hear only when sound waves of the ether impinge on the drum structure, at a certain other length and rapidity. It is so with touch, taste and smell. It is altogether likely that the structure of our nervous system re-

sponds to very few of the innumerable forms that matter and motion assume throughout the cosmos. This is the true reason of the limitation of our knowledge. The human organism seems to have evolved, in response to those incident forms of force, that contribute to its struggle for existence only; and all phases of its psychical aspect are emanations from this utilitarian necessity.

The principles of economics have been really the motive power controlling not only the polity of society but the very evolution of the human organism. There having been no genetic necessity for it to respond to any other forms of force, there is consequently no structure capable of it. We perceive only manifestations, or phenomena, not origin. We cannot lift the veil that conceals the "Whence" and the "Whither," except the natural laws of generation and of change of form by death, because biological evolution has not yet given the organs adapted to receive sensations from other than objective truths. It is likely that our present neural structure responds to an infinitely small part of the infinitely great variety of phenomena. All beyond such response is blank to us and therefore unknown. It may be thought that instruments can be manufactured and adapted to the different peripheral sense organs by which vibrations of the ether other than those now interpreted by the organs may be made available. I do not understand that telescopes, microscopes or megaphones change the number or length of vibrations, or convey other qualities of objects, than the natural sense organs are in the habit of receiving. These instruments simply bring our senses, such as sight and hearing, nearer to the objects seen, or heard. A telescope does not enlarge the

object's size. Could they bring sensations of objectivity entirely different from the ordinary sensations toward which the sense organs have been evolved, it is probable they would not be understood. For instance, if we should receive through any or all of our senses the sensations of the "thing in itself" which Kant says is now impossible to us, it is not likely we would understand it, provided it should be different from the aggregate qualities of things now received by the senses. It will require new evolution of sense organs and corresponding brain centers as well, before any change can be made in the number and quality of vibrations receivable by us. These evolutions would have been made already, had there been a necessity for such correspondence.

The logical sequence, to a knowledge of the limitations of the human brain, is, that scientifically we must test every proposition presenting itself to the brain by experience. If it cannot be examined empirically, if its components are not such objective truths as come through the senses, it is only a waste of time, and strength to pursue them. There are sufficient life problems, lying within the reach of inductive investigation, to occupy our whole time and strength. These are also the most and probably the only essential problems. In other words, given what our senses perceive in the universe, and what they may be made to comprehend, by further investigation by scientific methods, man may be able to place his organism in such natural adjustment with his cosmic environment, as to get out of existence all the possible benefits compatible with his individual, and racial relationships. Whatever is purely subjective is unknown and most likely unknowable. In other words, whatever cannot be

seen, touched, heard, smelled, or tasted cannot be known. The knowledge, we get from books, is the experience of other senses than our own; and much of this may be also our own experience. But the real knowledge we get from books and other methods of communication, that has not come to our individual senses, otherwise, has come to the senses of others. The above definition therefore defines all real knowledge, though it may not all come to the senses of every individual.

We can imagine a time, perhaps long ages from now, when the structure of the majority of brains will have so improved, as to respond more readily to complex and obscure phenomena, when the realm of delusion and illusion will have faded away, and with it will have departed all fear, idle wonder, and superstition. Mankind will not then be looking for the pot of gold at the foot of the rainbow; nor for Christmas gifts from a bearded hobgoblin. Man will not then spend his life fleeing from a horned spirit of evil, "a prince of the power of darkness." Then, he will have the ability, and can give the time, that is now spent by him in pursuit of an "ignis fatuus," the "unknowable," to the study of the natural laws of his being, and the founding thereon of a code of ethics adapted to his perceptible welfare in this world. His ethical code will not then be based entirely on the approbation or reprobation of some one outside of himself; but upon the wants of his own organism, and his relation to his fellowmen, and all other things in his environment, as taught by the never changing laws of Nature. Especially will his actions be good or bad, under this code, as they benefit, or detract from the welfare of the race, to which he belongs. He will then

do right for right's sake, not because the supposed wrong is proscribed under penalty, by some fellow being, who knows nothing about it.

Science tells him that the most important problem of life for him to solve, is how to obtain, and maintain, the amplest correspondence of his organism, in all its heterogeneity, with his wonderful complex environment, that is as wide, as the universe. This means health, happiness, and longevity. He will then learn, that a defect in this correspondence is disease, which will prematurely and unnecessarily lead, if not corrected by knowledge of natural laws, to that perfect equilibrium called death, when the law of his former evolution will be reversed. There will then occur an integration of motion, and a concomitant disintegration of matter, when the organic will revert to its original inorganic elements.

CHAPTER VI.

The Phenomenal Ego.

There seem to be just two sensuous conditions in the objective apparition, viz., space, and resistance. The space is extension, and resistances are the masses of matter. It is probable that these in their ultimate reality may be one. Accompanying these are the sensations of color and brightness. These make impression upon sight alone. From the standpoint of the mass, called the earth, to which our bodies are attached, by the attraction of gravitation, we perceive first the earth, with its atmosphere, next the sun; the moon; and the stellar bodies, as points of light in space. The earth, being our abiding place, presents a remarkably varied contour of surface, part land, and a larger part water. On the surface of the land, and in the water, are innumerable forms of what we call life, both vegetable, and animal. This habitat of man is a globe, moving rapidly through space, and is never twice in the same locality. From the sun, proceeds light, heat, and electricity, also solar dust and perhaps meteors of small size. Telescopes and spectroscopes reveal the shapes and components of the stellar bodies, to be the same as those of the earth. All matter is in motion, and all space seems filled with matter and motion, either in mass, or in what is called ether.

It is unnecessary to pursue the description further, because the perpetual apparition coming to the senses, of each human being, is well known, and a thing of every-day occurrence. It is so common, that the most of mankind cease to note it, as a whole; while the scientist who makes it his life's occupation to investigate its phenomena, is in touch with manifestations only,—and wondering at its grandeur, and meaning, but entirely incapable of penetrating behind the phenomena. Yet, he has analyzed its appearance sufficiently, to have formulated certain scientific hypotheses concerning the constant interchange of matter and motion in producing new forms. One hypothesis is, that all motion is uniform in its laws, and all mass composed of the aggregation of identical atoms, or perhaps, only centers of energy. Whatever the form of matter *en masse*, whether in what is called the inorganic, or the organic, it is undergoing a constant change, and that change is brought about in every instance by the same force, or energy; while no part of the matter, nor any of the motion is lost. Two theories result, viz., the conservation of energy, and the indestructibility of matter. It also means, that however different, in appearance, the innumerable forms of matter may be, yet all are composed of the same ultimate atoms, and are absolutely dependent upon the same motion, or energy, to preserve them, in their different forms, from moment to moment. This is the "Persistence of Force." It means, also, that however complex the combination of atoms, and however various, obscure, or impenetrable the retained motion of any mass may be; yet it can be only a differentiation of the universal unity of these elements, and is inseparable, and dependent, correspondence,

with all other matter and motion. Therefore there is no separate and distinct entity. Whatever may seem as such, is only a moving equilibrium, whose balanced status, at any moment, absolutely depends upon its integration, or dissipation, of so much matter, and so much motion, from the fixed quantity in the universe. This, as I understand it, is the generally accepted theory of physicists. Physicists are, also, rapidly concluding that matter and motion are only two phases of one phenomenon and that the ultimate ion is merely an electric discharge. Keeping in view these general principles, I will say something in this chapter regarding the human organism, as a part of the phenomena of the perpetual apparition,—the “Ego,” and its environment.

The term “Ego” was a definition of the mind, or the soul, as a separate and distinct entity, having no physiological connection with the body. Descartes says in the “Discourse on Method,” p. 171, “Universal Classics Library,” in the volume devoted to Descartes’ Meditation, and Philosophy: “I attentively examined what I was, and I observed that I could suppose, that I had no body, and that there was no world, nor any place in which I might be, but that I could not therefore suppose that I was not, I thence concluded that I was a substance whose sole essence, or nature, consists only in thinking, and which, that it may exist, has need of no place, nor is dependent on any material thing; so “I,” that is to say, the mind, by which I am what I am, is wholly distinct from the body, and is more easily known than the latter, and is such that although the latter were not, it would still continue to be all that it is.” This means that what I term the process of co-ordination of sensations, in the en-

undoubtedly only differentiations of the same basic unit of cosmic energy, whether this unit may be the atom or the ion, or an electric explosion, or something beyond the comprehension of the ego. The Ego, as thus defined, appears to be an entity to a casual observer, whose retained psychical and physical motions are not dependent on any connections they might have with the rest of the universe. But, to the penetrating eye of science, it is a heterogeneous organism, (see the chapter on, "A short outline of the principle of Evolution" where the development from the nebula is given), whose specialized organs are co-ordinated parts of the general mass of matter, and whose functions are determined by their connection with the persistence of force. It is similar to a wheel, in complex machinery, whose revolving motion depends on the connection of its cogs with those of other wheels. What we call human life then seems to be a correspondence between an Ego, or human body, and an environment with which, in order to maintain its continuance, it is necessary to remain in touch. Death is a discontinuance of this correspondence, and I am afraid that the "I" of Descartes might not then be able to think, having no environment from which to receive its sensations, that is, having nothing about which to think.

In other words, thinking is a passing condition, depending upon its physical connection with the body. No one has perceived it, except in that connection. This theory is diametrically opposite to that of Descartes. When Descartes turned his attention to the introspection of himself in order to determine the nature of the thinking process, he was a mature man. The function of his brain had acquired by the experience of all the years in which he had lived a certain

development by education and long use. The meditation of which he gives an account, was itself the result of the maturity of his psychic function, and at that time he was thinking upon the results or effects of years of training. This gave him the impression that the thinking process was to him so automatic that it appeared to him that it would proceed even without a body and without an abiding place. At the same time he claimed that he had purged his brain of all previous impressions or prejudices. We know that he was a believer in theology—a God and the soul of man, which he claimed is immortal, as a conscious entity. One cannot help thinking, notwithstanding he undoubtedly made every effort to forget for the time being these theological beliefs, yet how squarely his meditations supported on all sides these beliefs. He may not have been conscious of this. But everyone knows how impossible to get away, simply by one's effort to forget, from the teachings of a lifetime, and the impressions made upon the young mind by the teachers of supernaturalism. It can be done by a long line of study in the natural sciences, the facts of which replace in the mind the former theological impressions. But Descartes had not proceeded in that way, nor did he desire to get away from such ideas. To arrive at the idea of the true ego, he did not enter upon a scientific analysis of the connection of thought with the function of the brain. He made no genetic comparison of the growth of thought from birth to death at maturity. He had already concluded that animals did not think, and, therefore, he did not consider a comparative physiology or psychology. Had he studied the infant "mind" empirically, he would have discovered that its thinking was very small compared

with that of the mature "mind", and that as it grew toward maturity its power to think increased only with the growth of its body and brain. The use of the thinking process, stimulated every moment by outside influences, such as the matured actions and speech of its parents, teachers and playmates, shows that perhaps in its infancy its chance of independent thinking without a body or abiding place may have been a very negligible possibility. He would have discovered that the infant just born had a brain with all the cells and machinery for thinking just as the matured organism has, but that it evidently did not think until it lived long enough to have a past, in which memory had been weakly established by the experience of its five senses; and that, as this experience grew with the years of its existence, the power of thinking was determined by the brain structure and not by a thinking entity independent of such structure. Then had he studied the thinking process in the last days of a man's life, when his power of thinking was waning, in his second childhood, he would have found that the process of psychical development in the infant was exactly reversed; it declined as the time passed, just as the infant's increased; that those high modes of thought which came comparatively late in life, were the first to cease; and those instincts apparent in the infant survived to the last moment. Now, with these facts of the infant's and the aged mind before him, how could he conclude that the infant ego could think without a body when it could not think with one? And if the body of the senile octogenarian ceased to live after a large part of his thinking process had departed, would his ego go on thinking in the incoherent manner it did at the time of death, or would the process it had

lost come back to it after death? If it came back, where had it abided in the meantime? Could Descartes' investigations into this process of thinking follow beyond the phenomenon of death, and could he see with the human senses the process of thinking still proceeding without a body or a brain, there would be some evidence that such a process did not require those physical supports. But yet there would be an abiding place, or an environment for this supposed "thinking process" when the body had died; for who can assert that even a "spiritual entity" could pass beyond the realms of time and space? But unfortunately for Descartes' theory his human senses did not penetrate the future. He could only see the lifeless body which had lost the process of thinking, while the process itself, and its effects were no longer visible. How could he then "suppose that I had no body and that there was no world nor any place in which I might be, but that I could not therefore suppose that I was not". By mere introspection the mature brain cannot view consciously the thinking process. One is conscious of the effects of such a process, viz.: the ideas and judgments. He is conscious of the impressions made upon his sense organs by objectivity and of the final effects produced in the brain by these impressions or sensations. But whether this conversion of sensation into ideas is done by a spiritual entity permeating and working the brain tissue, or simply by the physiology of the brain in molecular metabolism, must be determined by each one for himself according as the evidence impresses his brain. But it cannot be determined by a direct observation, viz.: introspection. Both sides, the idealist and the materialist, agree that accompanying every psychical phenomenon such as

thought there is a certain molecular movement in the brain. But the contention of those, who do not believe that this movement produces the thought, viz the parallelists, is that the molecular motion cannot be measured as thought the same as reflex action in muscular motion, that the thinking process is a power independent of this "physical pulsation". So both sides are agreed upon the facts of molecular motion followed by the thought. One contends that the molecular motion or movement is the thought, and the other that the latter is really produced by a power that produces the thought through such movement, but is independent of physiological control. I know of no proof of such independence except the negative one that the conversion of molecular motion into thought cannot be measured in the way that the conversion of motion into heat, or heat into mechanical power can be measured. But this is not proof, except of the fact that no means have yet been devised to measure so delicate a thing, or more properly condition, as thought.

As each human being is a Phenomenal Ego, who has, to some degree, a different environment from every other, it will be interesting, and perhaps profitable, to endeavor to reason out the nature of this peculiar relationship, as a phenomenon. C. Lloyd Morgan in his article "Psychology and the Ego" in Vol. 10 No. I of "The Monist" says: "The first decisive step, in the analysis of the complex web of phenomena, is the polarization of the data of experience, into their objective and subjective aspects." That is, notwithstanding the monism of phenomena, the unity of all phases of psychical activity, yet in order to study its nature, we must analyze its

components, or at first divide it into two parts. The subjective aspect is the Ego's end of phenomena. It is the morphology of the energy, that the laws of nature aggregate in the individual organism. Dr. Paul Carus says, "Every mind is the concentrated effect of the whole cosmos upon one special part of the cosmos, not as it takes place in one moment, but as it has taken place in a definite and continuous period up to date." For convenience of study it is divided into two parts. One physical, by which the life of the organism is maintained, the other psychical, by which what is called "consciousness" is produced. In reality, they are both one.

The body is a differentiated part of the whole phenomena, and the most complex of organisms. The physical phenomena are sustentation, by which development and growth are produced, excretion, and procreation. Sustentation is only the building up of the tissues of the body, from the appropriate matter of the environment, the process,²⁰—metabòlism,—being the chemical, and mechanical motion; the aggregate process, being the integration of matter, and the dissipation, during the process of integration, of a large part of the motion. The appropriated matter having become specialized into the structure of the different organs, the function of those organs is that part of the former motion, connected with the matter prior to integration, which is not dissipated in the process.

The psychical phenomena occur through a peculiar, or differentiated, structure of the physical; and the resulting consciousness, or knowledge, or awareness seems to be a condition, whose real nature psychologists are now studying, and about which there is some difference of opinion. The process of the physical is termed

physiological, and the psychical, psychological. But this distinction is only one of ideal classification, for the purpose of study, and may not have any real basis in the natural phenomena themselves. For the material structure of the Ego includes not only the bones, muscles, and vital organs; but also the nervous structure as well, through, or by means of which, all the psychical phenomena occur. This nervous structure is only differentiated protoplasm of which the whole body is formed. Therefore psychology is frequently termed a branch of physiology. Jacques Loeb, in his "Physiology of the Brain", contends that, in function, there is no difference between muscular, and nervous structure, except in facility of movement of its component molecules. It seems, the further experiment is carried, the greater the evidence for unity, in both function, and structure. The five senses attributed to the body may perhaps in ultimate analysis be reduced to one, the primal, from which all the others have been evolved. That is touch. The eye, and the ear, are morphologically identical with the vibrissae, or most perfect organs of touch.

I say above, the psychologists differ in regard to the nature of "consciousness". James says, that consciousness, as a metaphysical *thing*, does not exist. Calkins says, "it is a self, conscious of itself." This is saying, it is a metaphysical *thing*. Others say, it is a relation of objects. It seems certain that in the correspondence between the organism and its environment, or between the brain centers and the object, the only thing is the object. The subject is not *in* the consciousness to the perceiver of an external object, that is, while the attention is directed to an object outside the Ego. Whether that object is tree, or an idea, or a prob-

lem, the fact, as it is represented to the brain, is the only conscious thing. It may be an hallucination, and not true; the brain "sees" it however just as it is. The brain may see it as hallucination a moment after. But the hallucination, followed by its being perceived, as such, are both real to consciousness. The one is just as true an object as the other. This is the doctrine of "immediate experience."

Now, premising that the Ego, as I define it, contains more of the elements of the objective, than of the subjective, and that physiology will, and does, explain the great bulk of the apparent psychical phenomena of it, a few thoughts given to the physiological psychology of the Ego let us hope will disclose some of its methods. This Ego is in consciousness as an object and can be studied. A thorough investigation, of the make up of the Ego, reveals that the sense impressions are produced directly by what is called a nervous system containing about 3,000,000,000 neurones, permeating the whole body, having its external terminations so arranged, as to carry with much more rapidity than the other structure of the body can do, certain objective sensations from the outside of the body, and also from those parts of the Ego objective to the senses from within it, that is, from all its objective organs, and functions, to certain internal terminations of this nervous system called ganglia, or neural centers. The largest ganglion of this system is the encephalon, or central organ; and is made up of innumerable strands of nerves, so interwoven, as to appear a solid mass of nervous matter. By reason of its extreme mobility this great mass of nerve tissue, permeating every point of the organism, is in perpetual motion. This isomeric molecular motion constitutes the consciousness of the

Ego, keeping it in perpetual unity with the same energy, or force, producing perpetual molar motion in the environment,—the two being differentiated phases of “the persistence of force” Or I will say, that neural molecular motion produces a relation between objects. —This relation is Consciousness. ,

It is a condition produced by cerebral activity. If consciousness is anything more, than the arrangement or metabolism of the living molecules in the brain, what becomes of it when it is temporarily lost, for instance, by a blow on the head, and when by a surgical operation it returns? Holmes reasons, “A man is stunned by a blow and becomes unconscious, another gets a harder blow and it kills him. Does he (the latter) become unconscious too? If so when, and how, does he come to his consciousness? The man, who has had a slight, and moderate blow, comes to himself when the immediate shock passes off, and the organs begin to work again, or when a bit of skull is pried up, if that happens to be broken. Suppose the blow is hard enough to spoil the brain, and stop the play of the organs, what happens then?” (“Hereditary Traits”, by Richard A. Proctor.) Which is the more reasonable supposition, that the entity, that does the thinking, “goes off” and awaits the trepanning in the one case, and “goes off” and never returns in case of no returning consciousness; or that consciousness is the physical process of molecular motion in the brain tissue? It ceases, as long as the motion of molecules ceases, and is “restored” when such motion is resumed. But, if the molecular motion never resumes, then there is no restoration of consciousness. “Dual consciousness,” “bodily illness, as mental stimulant”, “somnambulism”, “hypnotism”, “dreams”,

can be scientifically explained by knowing the exact facts of each case, on the theory that psychic phenomena are the products of physiological function,—that consciousness is the result of molecular nervous action; but not upon the theory that such phenomena are produced by a spiritual entity occupying the brain space, and working through the nervous tissue.

Whenever there is an impression made on any of the organs of the senses, it is conveyed inwardly, along the receptive nerve, by what is called isomeric molecular motion; that is, there is a re-arrangement and more or less destruction of the little invisible particles called molecules, which make up the substance of the nerve, through its whole length, or through a sufficient length, to convey the impression to one of the ganglia. These ganglia, composed of yet more mobile matter than the nerve threads of conveyance, add to, co-ordinate, and discharge the motion along effector, or motor, nerves, and thus produce the phenomena of bodily motion, and all the phenomena called psychical. The ganglia acting, apparently, like galvanic batteries of electrical energy, send the impression, if need be, by the molecular motion of motor nerves, to exhaust themselves in muscular action. But, if the sensations are of a nature to require brain action instead of muscular action, then the sensuous energy coming from the environment is conveyed to the central nervous organ, called the brain, and there by molecular and chemical process, it is co-ordinated into one of the phases of psychic phenomena, called perception, image, emotion, conception, reason, memory, or will. The individual sensations are co-ordinated with each other, by the patterns of nerves in the brain, and this produces generalizations and abstractions. It, also, in its

normal condition, produces effective co-operation in all the movements of the muscles. When there is lack of proper co-ordination for any cause, such as lesion of the brain, there results that condition we call insanity. This co-ordination is prevented also by intoxication. The whole is physiological in process, while the result is psychological. Thus every so-called mental operation is produced by impressions, coming from the environment, by way of the senses, into the nervous structure, and then further producing a resulting molecular motion, which is the psychical phenomenon. It is all the result of natural force, the "persistence of force" acting along the line of least resistance.

I notice that Max Muller says, that if mind is to be the name of the work, "what is to be the name of the worker?" I take it, this is the persistence of force, that does the physical working everywhere, in nature. But there is no necessity to name the worker. If some personality, or entity outside of nature itself, does the working everywhere, then this same personality does it in the brain, but not if evolution is true. Natural cause and effect only are supposable in evolution. But the fact is, human knowledge never penetrates beyond the working, and in the utility of it to the welfare of man, the working is the thing to know. I think however with Müller, that the old subdivisions are too cumbersome and complex.

"The complicated apparatus which had been postulated by most philosophers for the performance of thought, in its various spheres of manifestation, must make room for much plainer machinery. Instead of intuition, intellect, understanding, mind, reason, genius, judgment, and all the rest, we want really

nothing, but a self-conscious monon, capable of changing all that is supplied by the senses, into percepts, concepts, and names." It seems to me that the plainest machinery for this purpose is what we see in the process, that is, the "nerve structure" — not "monon." That has been evolved, and this conclusion will comply with both simplicity and evolution. "Self" is the organized human body, with its brain and nerves maintained by the motion of its component atoms, as a part of the living Cosmos. Its retained motion is a part of the general energy, or persistence of force. A "self-conscious monon" does not exist. The change of sensations, into concepts, is done by nerve molecular motion. Prof. Joseph Le Conte says, "If the brain of a living, thinking man were exposed to the scrutiny of an outside observer, with absolutely perfect sense, all that he would, or could, possibly see, would be molecular motion, physical and chemical."*

Even sleep, which is the period of rest to the functions of the nervous system, is caused by the contraction of the blood vessels of the brain, and the enlargement of the peripheral termination of the circulatory system, thus lessening the activity of the molecular motion which sustains psychic phenomena. The resulting inactivity of the senses, is sleep. It is often asserted that the mind, as some call the functions of the nerve tissue, never sleeps. One proof of this is the supposed mystery of dreams. I think that dreams do not come in profound sleep,—that is, when the molecules of the nerve tissue, which produce the psychical phenomena, are at rest. It is probable, that those nerves that sustain the physiological function of re-

* Work called "Evolution."

placing the destroyed molecules of nerve structure, may be as active in profound sleep as during the waking hours. Dreams seem to be produced during the decreasing activity of the molecular motion of the psychical patterns of the brain, in process of going to sleep, or, by the nascent motion of the same molecules, in the process of waking. At these two opposite periods, the sensations coming from the environment are not operative, but the faint and imperfect representations of former sensations are produced by the feeble movements of the molecules, not vigorous and true as when first presented, in the waking hours, but modified and never an exact copy of the original. Thus dreams seem to be of different degrees of truthfulness. As the brain approaches sleep, the first dreams are likely to be the most vivid, and representative, but as sense activity gradually declines, they become fainter, and more fantastic, and at last incoherent. This order is reversed in the period of awakening, the last dreams that precede the final opening of the avenues of real sensations coming from real objects in the realm outside of the Ego, being more definite, and true to the reality, than those preceding. In this sense, dreams are in line with other psychical phenomena, having physiological marks. Profound sleep may be prevented, by various abnormalities acting on the senses, such as indigestible food in the stomach, aromas coming in excess to the nostrils, or unusual pressure on any part of the body. In such cases, there is not profound sleep, and the molecular nervous motions are more or less active, producing corresponding representation of modified forms of previous sensations and ideas, or dreams.

The assertion that the function of the nervous struc-

ture, as above set forth, produces consciousness, includes, of course, the process of thought. Thoughts, or the process of forming ideas, are accompanied by the same objective physiological marks, that characterize all psychical processes, they are molecular motion. Consciousness is a condition, which is best described by calling it a correspondence between the brain structure, and relations in the objective. The Century Dictionary says, the word consciousness is derived from the Latin *consciens*—knowing, aware. Therefore it is the aggregate of knowledge, or awareness, possessed by the Ego. This knowledge, of course, includes the perception of self as I define it objectively. The term subjective is, as a thing in itself, artificial because the Ego, including consciousness, as far as it can be scientifically studied is objective to the senses. Consciousness itself is a condition, and has no contents. The things we see, do not exist *in* consciousness. They exist only where we perceive them to be. And this is what Descartes terms the ego. His expression. "I think therefore I am" is therefore a description of a process of imaging of objective things by molecular motion, and the fusing of images by a change of molecular patterns on the brain. It is a passing phase of function of matter. Those immediate experiences that the individual cannot share with others, such as the voices heard by Joan of Arc, or the dreams one has, may be called subjective conditions, because if they were objective, others would also experience them. But these are mostly abnormal. Therefore, an advance is rapidly being made by psychologists from the current conception of consciousness and of the idea of "subjective" and "objective," to a better description of the apparent condition as one of "immediate ex-

perience." I cannot stop here to further elaborate the meaning of this latter term, or the significance of the trend from unfit terms to those more appropriate; except to note that it is a step away from idealism and the old conception of the mind and soul as entities. In every experience, such for example as listening to a song, there is just one element present to the listener and that is the song, not the subjective listener, as defined by Descartes. When I perceive a fact, or physical thing, consciousness consists only of the fact or thing. But if the attention should be turned from the fact or thing to the subjective process, then the latter would become immediately objective. As the ideas produced are so apparent to us, and make such a profound impression on us, many persons unconsciously conclude that they are the voices of "divinity". They are part of the natural order of the universe, the same only as all other phenomena.

The physiology and the anatomy of the body are perceptible to sight, hearing, taste, touch, and smell. Touch is most largely the sense of self feeling. Pleasure is the harmonious touch of all function. Touch is not confined to the ends of our fingers, but is an all-pervasive sense located in some degree in every surface both inside and outside; and pain, which is the alarm from the outposts of the neural fortress that an attack of a destructive kind is being made, accentuates the great importance of the sense of touch to the organism. Touch exists wherever there is living nerve. It is the all pervasive and primal sense. We are self-conscious to the extent only that self or the ego is objective to the receptive nerves and ganglia. This is evident, for whatever parts of the body, or its functions, make impression on the sense are objective.

Almost every function of the body is part of consciousness, if not in its physiology at least in its results. The simple emotions, as well as thoughts, such as fear, hatred, affection, self-feeling, and sexual emotions, are manifested by objective physiological marks in the organs that display the phenomena. The physical changes constitute the emotion.

In his address to the Physiological Section of the British Association at its meeting in 1904 at Cambridge, Prof. C. S. Sherrington made the following statement: * "In the integrative function of the nervous system the unit mechanism is the reflex. The chain of conduction, in the reflex, is a nervous arc, running from a receptor organ to an effector organ, e. g., from a sense organ to a limb muscle. The characteristic of the synoptic system is, that the chain consists of neurones jointed together, in such a way, that conductivity seems possible only in one direction." He says that "the receptive neurone conducts only the impulse generated at its own point, and other receptive points cannot use it. But at the terminus of every reflex arc we find a final neurone, the ultimate conductive link to an effector organ, gland or muscle." "It does not subserve exclusively impulses generated at one single receptive source alone, but receives impulses from many receptive sources situate in many, and various regions of the body." Thus, "Reflex arcs arising in manifold sense organs can pour their influence into one and the same muscle. A limb muscle is the terminus *ad quem* of nervous arcs arising not only in the right eye, but in the left, not only in the eyes, but in the organs of smell and hearing, not only in these but in the geotropic labyrinth, in

* See the October, 1904, number "Popular Science Monthly."

the skin and in the muscles and joints of the limb itself and of the other limbs as well. Its motor nerve is a path common to all these."

I consider a system of conductivity so elaborate as this, with functions so complex, and far reaching, as being sufficient in itself to produce all the phenomena of psychic action, as we feel and perceive them in our own bodies, and as we perceive them in the bodies of others. I will quote further from this able address of Prof. Sherrington's. "The conducting paths in the great central organ are arranged in a particular pattern. The success achieved in unraveling of the conductive patterns of the brain and cord is shown by the diagrams furnished by the works of such investigators as Edinger, Exner," and others. "Knowledge of this kind stands high among the neurological advances of our time. But the pattern of the web of conductors is not really immutable. Functionally its details change from moment to moment. In any active part it is a web that shifts from one pattern to another, from a first to a second, from a second to a third, then back perhaps to the first and then to a fourth and so on backwards and forwards. Locally the patterns are in constant flux of back and forward change." He closes the address by saying, "If we regard the nervous system of any higher organism from the broad point of view, a salient feature of its architecture is the following: At the commencement of every reflex arc is a receptive neurone extending from the receptive surface to the central nervous organ."

Introspection means the turning of the senses, from external objects inward, to observe the workings of our own organs, including the brain. Whatever we perceive in this way is self-consciousness. If one could observe

the motion of the molecules of the brain of another body. this would be purely objective, and would not be self-consciousness, but circumstantial evidence, that the same phenomena occur in the observer. It is good evidence that the same thing occurs in our own brains which are similarly constructed. The study of the anatomy and physiology is entirely objective, but so must be the study of psychology, as the study of the relation existing between our own conscious states and things in the environment. Says William Henry Howell, professor of physiology in Johns Hopkins University, in a paper entitled "Problems of Physiology of the Present Time" at St. Louis in 1904; "We are not able, at present, it is true, to form any conception of the nature of the relation between the subjective and the objective, but new facts may alter wonderfully our insight into this mystery, and it is the clear duty of physiology to participate in the work of accumulating all possible data bearing upon this relation" Says Harold Hoffding, professor of philosophy in the university of Copenhagen, in a paper read before the section of psychology at the same congress in St. Louis, entitled "The Present State of Psychology etc.", page 627, Vol. V, of Proceedings, "The only working hypothesis, which makes possible a co-operation between physiology and psychology, without any encroachment from either side, regards the relation of mind and matter, as a functional relation in the mathematical sense of the word, and tries to find as much continuity within both series of phenomena as possible." The "encroachment" he speaks of is natural, for "both sides" are one and that one physiology. The question is how the excitation of the receptive nerve by an incident force proceeding from objects in the environment produces in

us a state of consciousness and the particular forms of psychical phenomena called conception, reason, memory and will. There seem to be no distinct departments of these functions, but they are modifications of the general psychical method. We can only cognize the physiological marks accompanying the phenomena. The manifestations are objective. When the images of externality are formed on the cortex of the brain, it is a natural process of molecular motion and results in consciousness. It is a passing condition called "immediate experience". The images on the brain are perceived externally in the locations of the objects perceived; and the difference between the perception of one person and another of the same object, as well as, the perception of an imaginary thing not seen by another, can be called subjective. It is this excitation of the nerve tissue of the brain by the incident forces of objectivity and the process of the fusion of the images thus formed, that is the thinking process. Descartes calls this the ego, and that alone of the whole body survives. A mere statement of the process is sufficient to show the probable error of Descartes' view.

A late work "Structure and Growth of the Mind", by W. Mitchell, undertakes the "direct explanation of mind." A reviewer of the book in "The Journal of Philosophy, Psychology and Scientific Method" says, "The author proposes to improve upon dualism and parallelistic monism by the following generalization: 'A mind and its experiences are realities that are presentable to sense as the brain and its actions. In that respect the mind and experiences are not parallel with Nature but a part of it. And on the other hand the facts of nature including the brain, whenever they

are phenomena, are not parallel with mental phenomena but a part of them." Now, this is the same as my definition of mind: "The correlated function of the brain and all the nerve tissues." Of course, this function is part of general natural phenomena. The definition is in accord with monism.

Now, coming back to the physical marks accompanying the act of thinking, they are very clear to the perception.

"As a man thinketh in his heart, so is he." His thoughts are indicated by outward acts, in the motion of the muscles, e. g. in speech, or in written language. If not in either of these ways, then the intensity of them can be determined by the following marks; expansion of the arteries leading to the brain, and the consequent increase of the circulation to the brain. These accelerate the action of the heart, which modifies the whole vascular system; or by the fixedness of the muscles, controlling the eyes, or other organs of sense. All the emotions can be expressed without articulate speech. Laughter is the expression of joy, weeping of grief, smiling of pleasure, bodily attitude of anger or fear. These emotions are all more or less expressed by the muscles of the face.

In fact, in a broad sense the signs of life are the marks of thought. When the human senses become acute enough, they will perceive every thought by its physiological marks in another.

Should these physiological manifestations be prevented, in any way, as by pathological conditions, then there would be no thought; and I suppose that interference with them, in any degree, would in the same degree lessen the coherency, and perspicuity of the thinking. I think, if all the data of consciousness

could be enumerated from the center of attention at any moment to the thousand things in the margin, or subattentive aurora of it, it would be found, that all are objective, and come through the senses. The consciousness of one, deprived of every sense except touch, would be found to be made up of sensations coming from the environment that act only on that sense. Should that also be taken away there would be no consciousness, and perhaps no life. The psychologist who contends that the molecular motion, or function, of the nerve tissue of the central organ cannot be transformed into, or rather that it is not thought, must account for thoughts in some other physiological process, or by some unknown agency, whose seat is in some unknown locality, acting directly in co-operation with the molecular motion. Otherwise he must declare himself an agnostic, as to this phenomenon. At least the thought cannot be dissociated from its physical connection, and until experience has disclosed other agency, I see no way to avoid the hypothesis of the transformation of molecular or metabolic motion of brain cortex into thought. The word "function" explains all psychical phenomena. I cannot conceive of any function for the molecular motion in the brain unless it does produce thought. Certainly sensation precedes thought, and sensations are conveyed to the brain by molecular motion. Beyond that I have failed to discover any natural explanation of the phenomenon of thinking.

This theory presupposes that the operation, of all his senses combined. gives man all his so called mental, moral, and physical characteristics. Without a ganglionic nervous system he could express none of these manifestations.

The assumption, either expressed or implied, that our consciousness is produced by an agent, or entity, located somewhere in the body, and catching the sensations conveyed from the environment by nerve molecular motion, as the telegraph operator formulates the messages that pass over the wires, is analogous to Kepler's assertion, that notwithstanding his own natural laws of the orbital motion of the planets, yet there must be an angel in each star to hold it in its orbital relation with the sun. Newton brushed away that idea, by demonstrating the natural principle of the attraction of gravitation.

"The psychology of to-day has found a place in the natural system of things, for those strange and relatively unusual phenomena of consciousness which but a short time ago seemed to the scientifically minded totally unreal, and to the superstitious, manifestations of the supernatural". F. C. French in No. 26, volume 11, "The Journal of Philosophy, Psychology and Scientific Method." "However real the supernatural may be, however important ethically and spiritually may be our attitude toward the supernatural, it no longer interferes with the laws of nature." Same.

By observing the gradations of complexity, and definiteness in the nervous systems of animals, from the lowest to the highest, it is plain that intellect, and intelligence, depend upon the correspondence that these systems give the body with the relation of things in the environment. In other words, the psychology of the animal is the degree of perfection of this correspondence. The lowest animal life is without nerves. It has only the sense of touch, and that very feeble. In this regard it is very different from a human being deprived of all senses except touch. Such a human being

is possessed of the nervous structure constituting the grey matter centers of the other senses; and by the associative conductive paths crossing in great number every part of the brain, these centers of the other senses are excited to the vicarious performance of the psychical functions of each other. So that the sensations coming through the sense of touch alone to such a brain structure produce, more slowly, only, nearly as much mentality, after repeated practice or experience, as if the outward sense organs were all in normal working order. The reaction of its muscles to the sensation of touch is slow in the animal without nerves. Such animal life is sustained by the absorption of whatever suitable matter comes casually in contact with its surface. It is without other intelligence, than sustentation, and procreation. It has no correspondence with spacial environment and none with the time sense. The difference between it and the most intellectual man is the difference of complexity in physical structure, which of course, includes nervous structure, corresponding with a like complexity in the not-self.

It will be found also that every thought is based in physical necessity. Why does the twining vine grow its first two joints rigid, and the third so mobile that it will vibrate in a circle, seeking an object around which it can twine? Or why does the rhizopod contract, and appropriate the soluble and nutritious particles, coming in contact with its surface, but rejects the insoluble and inorganic, unless it is, that both phenomena in all essential elements are expressive of the same choice in less degree, as man makes, in his reasoning out a civil and moral code, which man considers essential to his physical welfare; the same essentially that similar acts by man, although more complex, constitute, what is

variously expressed by the words, thought, reason, memory, will? This basis or stimulus to all thought is the necessity of the natural preservation of the organism, or of the race, to which it belongs. In the case of the human being, and many lower animals, especially bees and ants, there is the added condition of social life which is also essential to their existence.

There are certain functions of the brain producing abstractions, and generalizations, whose connection with self, or race preservation, is difficult to trace. But I think there is a connection. Whoever is unselfishly pursuing truth in the abstract, is doing it, by the compulsion, or tendency, of his organism. Truth is essential to his organized brain structure, or his nerve structure is in necessary correspondence with a higher environment, in which truth is the essential thing. To the devotee of esthetics, the beautiful is a condition of natural existence, or at least of social existence to him. To him harmony in sound and color is necessary to the preservation of his organism. Whatever man does seems in the last analysis to have, at bottom, the motive of preservation of either self, or the race. The principle is apparent in all commercialism, and industrialism. It is not so apparent in art or in poetry. Yet when the artist paints a picture like the *Angelus*, or the poet composes a "*Thanatopsis*," or an "*Iliad*," its greatness really consists in its lessons of true life; it points the way to higher, broader, and deeper conceptions of man, and his relations to his fellows,—that is, it shows man how to preserve and broaden his life.

All esthetics, music, poetry, the drama, the limner's art, like science, are the property of every nation, and however diverse the languages, these works of art

have a common meaning and universally appeal to all peoples. They are therefore a universal language for the promotion of the brotherhood of man; which means that the destructive forces of human life and welfare are thus greatly modified and will be finally abolished. Therefore art is a promoter of the physical welfare of the race. So it is in altruism. This is only a higher effort to preserve the race. The physical, economic conditions of all forms of society,—the municipality, or the state, or the nation,—always determine the political policy, and give the tone to its organized religion also. It is this principle that determines the difference between the Asiatic and the European countries. England, from her isolated position, and contracted territory, is, for that reason, compelled to adopt an entirely different political policy, from that of Russia, for example.

Auguste Comte in his positive philosophy refused to recognize psychology, as a science distinct from physiology. The reason is not obscure. It is, that every psychical phenomenon has its physiological marks, in the absence of which, there is no phenomenon. The new psychology is physiological. The old was metaphysical. Note the material elements of a Spencerian definition of an idea. "The psychical side of what, on its physical side, is an involved set of molecular changes, propagated through an involved set of nervous plexuses; that which makes possible the idea is, the pre-existence of these plexuses," and they are the only part of the phenomenon that persists. The assumption, that there is any other element, takes the treatment of it out of the realm of psychology, or science, into that of metaphysics. Spencer's definition of an idea is inductive or scien-

tific. Note the contrast between that and Descartes' definition, in which the physiological element is omitted. Descartes says, "By the word idea, I understand that form of any thought, by the immediate perception of which I am conscious of some thought." This seems to me, no definition at all. No scientific definition can be given, except that the physiological changes, constituting the phenomenon, give the psychological effect. Of a piece with Descartes' definition of an idea, is his proof of an existence of a God. He says, "The existence of God is known, from the consideration of his nature alone." Even the Church of France could not abide this kind of nonsense, and repudiated the Cartesian proof of God.

The thought of one man is different from that of another, because the nerve structure is different. The difference in character among all animals is the difference in physical structure. This difference produces different phases of intellect, and emotion. All animals are characterized by the emotions, and whichever emotion, fear, anger, affection, or self-feeling, predominates, gives the temperament. These emotions, in the lower animals, are unmodified, or very little modified, by the brain or intellect. But in man the superior quantity, and intensity, of brain matter, puts him in so much wider, and more complex, correspondence with obscure and complex relations in his environment, that the impulses of the simple emotions are greatly modified, or checked, but the process is molecular motion. That form of consciousness called reason and memory seems to be, merely arrested reflex motion. The reflex arc of the nervous system, in low orders of animals, consists of a receptive neurone, a central ganglion, and a motor nerve running

from the ganglion to the muscle. The motor action follows immediately the sensation. In the nervous system of man, there is the same unit of the simple reflex, and as many, or more, simple responses to sensory stimulation, without the interposition of consciousness. But there is also the large ganglion called the cerebrum, into and from which, run nerves in continuation of the simple reflex. Those sensations, too complex for simple reflexes to solve, pass over the more complex arcs into the brain centers. The resulting perception, or conception, or abstraction, is a higher phase of consciousness. That is, these higher centers of psychical action arrest the flow of sensory activity, and turn it from the motor channel, into the ideational centers. The psychical result is a relation called consciousness. It is the physiology of the organism, that is modified by the difference in structure, and at the same time there is a corresponding difference in its psychology.

Let us consider for a moment some negative concrete evidence that consciousness is a phenomenon and not an entity, not supernatural, and that thought has a physical basis in the preservation of the individual, or of the race to which he belongs. Few books account for the natural truths most important for man to know. The account of creation given in Genesis is scientifically impossible and altogether unsatisfactory. It could not have been dictated, or inspired, by an omnipotent personality, the creator of all things. It bears the impress of simple guesses by a thoughtful human being. If the "soul" is that part of the human organism that not only produces human thought but connects the being with a creator, it should produce a human consciousness of truths now unknown but of such

seeming importance in the theological code as the nature of the Deity, all the methods of evolution, "whence" man came and "whither" bound, the origin of matter and mind, or the real reason for existence, or why it is necessary for man to develop from a cell in each individual instance, grow to a certain size, remain in constant activity a certain time, then cease such existence in every instance, and go back into the original elements of inorganic matter from which he apparently evolved. The longing for a true knowledge, the prayers that have been made by mankind for centuries for true knowledge, upon all the matters that bear upon an assumed relation of a creature to a creator, should have produced some communication of these facts provided there is such a connection between an assumed "soul entity" and its all-wise and loving creator. But the response has been a blank. In the meantime, against the protests of the believers of this connection, the plodders in science, without the aid of prayer, relying solely upon the resources of the limited human brain, have disclosed some truths not compatible with the declarations of the Bible. Not yet, however, is man able to tell with certainty how long mankind has been on the earth. The records begin a few thousand years ago, but fail to give any intelligible account of how this peculiar form of matter and motion called life, began; or why it seems to have arisen at a late period in the evolution of one of the smallest globes, of not only the universe, but of the solar system. Nor do they tell whether the other globes have life; or why they evolve in the way, and in the localities they do. One of the very important things for man to know is how he has evolved

to his present condition. If he could know all the steps, the potent factors of his evolution, both as an individual and as a social being, the dispute now going on concerning the potential means of future evolution, biological and social, would be settled. But the inward monitor, supposed by some to be supernatural, or supersensuous, is silent upon enlightenment so important. Science has solved some of these problems, satisfactorily to itself but not to theologians. It should seem to those who believe the mind to be a spiritual entity, and part of the universal "soul" substance, very peculiar that so many things remain unknown to the highest intellect. This want of true knowledge, producing agnosticism, is not, however, surprising to a student of modern psychology. It is the physical limitation of the Ego's correspondence with phenomena. The Ego has no physical structure capable of interpreting a hundredth part of phenomena. Could this correspondence be extended to a supposed reality behind the phenomena; or if a part of that reality existed as a monitor, as an entity in the body, to produce the thoughts and ideas of that body, then these insoluble questions should easily become soluble; otherwise what is the necessity for the conception of other than natural forces in the nerve tissue?

The Ego,—the human body,—being a part of phenomena, is only a differentiated species of phenomena, and seems to be inferior to many of them, in the power of producing results. For instance, matter and motion in the transformation from the nebula, to the present status by evolution, has produced in physics, the harmony of the stellar bodies; in chemistry, the atmosphere and water; and the light of sun, which falling

on leaves and flowers, reappears as life.* Whether the true theory of light is that of Newton,—the corpuscular, or that of Huygens,—the wave, yet we know it conveys to us, by photography, and the spectrum, information of the remote parts of the universe, beyond the power of any other known form of matter and motion to convey. It is true, before man can interpret these, he must have a nervous power; yet power of nerve tissue, or thought, or any psychic phenomenon, is tame in comparison with this phenomenon. It appears to me that the Ego's limitations prove it to be only a part of phenomena. And these material phenomena, from which the brain of man derives so much knowledge, must have been in operation just as they now are, ages before there was an Ego. Had there been any design in their evolution, with reference to adapting them to the use and benefit of man alone, the wonder arises why they preceded the advent of man, apparently so long.

I have been looking for a number of years for some explanation of "mind" and "soul," for some common sense and chemical, or mechanical, explanation of the psychical phenomenon. But every treatise upon this subject is tinged with the peculiar temperament of the author, or is, consciously or unconsciously, influenced by his theological early predilections. Spencer's psychology came the nearest to explaining, because he discarded Kant's theology, intuition, idealism, etc., etc., and treated the subject scientifically, that is, by the use of his five senses and not by the imagination. Yet he tried to convince his readers, by

* Le Conte's "Evolution."

the introduction to his "Synthetic Philosophy," that he was not a materialist. He could not treat the subject scientifically for a single moment without standing firmly by matter and motion,—or a physical basis. He recognizes these all through his work. Huxley has conclusively shown that the idealist and the materialist, when they treat the subjects honestly, arrive at the same goal. When Descartes takes for granted the existence of a thinking self, called by him "I," separate and independent of all material connection, without any other proof than his own intuition, there is a very unsatisfactory hiatus, to my brain, between such proof and the proof I desire of so important a proposition. For if such an entity,—the real self, which would be the "immortal soul," exists in every human being, there must be better proof of it than mere assertion, or hope, or faith. We are conscious only of sense impressions, of the thoughts, the ideas, and when these are plausible interpretations of apparent facts in man's life, they appear to react on the lives of men in producing what we term desirable and permanent effects. But when men see that thoughts are produced only when the tissue of the brain and nerves—a material substance,—acts simultaneously with the thought, there must be more convincing evidence given, that the thinking is not done by this motion of such brain and nerve, than the mere assertion that they are not thus produced. Merely saying that thought must not be attributed to molecular motion, and that such motion accompanying the production of thought is perfectly compatible with the independence of the thinking process, does not satisfy me. It is necessary to show that independence by evidence as palpable as the molecular motion is, in order to

carry any weight. Now when a scientist plainly says, "My senses plainly recognize the existence of matter and motion, whose origin I do not know, and that all things are formed of this matter and motion by a process palpable to the senses called evolution; and that actual chemical analysis shows that the brain and human body are composed of this same matter and motion; that nothing else is left after such analysis palpable to the human senses," why is it necessary to assume that the brain and nerves do contain something else and that this something else is the only reality and the only producer of ideas?

I, therefore, conclude, there seems to be nothing in the Ego, either subjective, or objective, to give it special standing, outside of the perpetual interchange of matter and motion apparently going on, throughout the universe. There also seems to be no other logical conclusion from all the facts, than that the mind is a relation between certain objective phenomena and the tissue of nerves in the body, and that such relation passes away with the passing of the Ego. But the objective phenomena continue, and do not in any respect depend for their existence on the consciousness of the Ego. It is quite certain, also, that this consciousness is only a relation between a very limited number of phenomena. An infinite number probably exist in the Ego's environment, whose relation is beyond the comprehension of human consciousness. In other words, the known is finite and the unknown infinite.

A lesson taught by these facts, and conclusions, and a most important one, is that the physiology of the nervous organization, being the "mind," should be the

object of our special care and attention. Its hygiene is the preservation of our real identity and usefulness. Its care, and the profoundest knowledge of its nature and requirements, are very important parts of a natural religion.

Note to page 244. "Loria declares that statistics prove 258 out of 286 wars to be distinctly due to economic causes"—Cohen

CHAPTER VII.

The Materialistic Basis of All Things.

The true lover of natural phenomena, especially of the beauty and harmony of the usual apparition, that is so constantly present to the senses, cannot restrain a tendency to philosophize. Nowhere is this tendency more compelling, than to him who wanders amid the silence and grandeur of the Rocky Mountains, along the banks of a clear sparkling stream; away from the common haunts of man. Here Nature, figuratively speaking (meaning the combined phenomena of the universe), whispers the purest truths into the ear of the willing listener; and never misinforms her votaries; although those votaries may at times draw wrong conclusions from the whispered truths. She is the mother of us all. While lingering near her heart, my brain was greatly impressed with the following ideas. They do not form a logical whole, yet they may impress the reader, as they did me, how important it is to the human organism that each individual keep in harmonious correspondence with these phenomena, from which he draws all the sustentation of his moral, intellectual, and physical being. The words "mental" and "moral" used here, and throughout this chapter, are intended to convey ideas, only, of convenient artificial divisions of the functions of the ag-

gregate organism. They are mere definitions of certain manifestations of the normal working of the nerve structure as a whole, and of the resulting psychic life as a unit.

It occurred to me that Buckle in his Introduction to his proposed "History of Civilization in England," tried to show that it was not the occult, or so-called spiritual, that was the basis, or the real cause of our civilization; but that the soil, climate, and locality, together with hereditary industrialism, accounted for the difference between the social welfare of one people, and that of another. A French author has lately written a book to prove that the superiority of the Anglo-Saxon in the battle of life, is really founded on his love of the soil, as the true source of his wealth and power. He claims that the Anglo-Saxon, wherever he settles, fastens himself, and family, on the all-loving mother earth. and turns her kindly productiveness into the wealth for which some other peoples are inclined to look to fictitious sources. This disposition is also shown in his great desire for personal ownership of the soil in fee.*

The real meaning of these authors and others, who take a like view of history, seems to be that the fundamental basis of a true civilization is what is usually termed physical. They do not ignore, that in the higher manifestations of mental life, certain functions appear, in so subtle a form, that the ordinary man calls them spiritual, or supernatural. But these authors are not misled by such appearances, and are in accord with biological scientists that such appearances are the outgrowths of matter and motion. They therefore

* "Anglo-Saxon Superiority" by Edmond Demolins.

advocate the supreme importance of teaching mankind, that natural and physical laws are the true sources of their strength and power. The subjects treated by them, and the manner of their treatment, indicate that strength of character in the individual, or a people, is derived from a proper observance of the ethics of domestic economy. Industry of every kind is rooted in the soil. All life and wealth come from the land. Commerce on the water is impossible without landing. No business can be conducted except it has a footing on the land. Our sustenance comes from it, and its necessity to man does not end with life. He occupies a part of it after death. Is it wise then that the whole people should allow a few to monopolize it? The object of statistical science is to determine the real causes of the forms of civic polity. By the beginning of the nineteenth century some nations had so far perfected the system of census statistics, as to disclose the laws governing political divisions of men. At the beginning of the twentieth century greater perfection of this science still discloses that the real causes of the alterations going on in forms of society and government are always material, usually economic. It is sufficient to cite the French Revolution and the War for Independence in America. The causes recited in the Declaration of Independence for the action of the colonies are nearly all materialistic. While the Constitution, framed after independence was won, omitted any provision for a religious establishment, yet the declaration did not recite a theological reason for the war. It was the same with the Magna Charta in the old country. It was demanded of the King for economic and material reasons.

These facts, carried to their logical sequence, result in the most enduring and beautiful ethics. The man who is really true to the physical laws of nature, is also true to his fellow man. He becomes altruistic in the highest sense, and is a living exponent of the golden rule.

A study of the rise and fall of nations, as disclosed by the one-sided and distorted history of them which we possess, shows that no civilization, yet evolved, has long endured. The Assyrian, Babylonian, Egyptian, Hebrew, Greek, Roman, were all based upon some fatal error. They decayed, and finally fell. Civilization is made up of two essential things, viz, man's relation to his fellows, and to his non-human environment. His relation to his fellows must be determined according to the principles of evolution by natural selection, or the survival of the fittest, by which the weak are replaced by the strong; and the attitude that the leaders of thought assume toward this principle will determine the early, or tardy, change of the present theological attitude to one of naturalism. As man's intellect expands, changes in beliefs necessarily follow. Especially as fundamental truths reveal themselves, successively, to his enlarging perception, he necessarily keeps continually readjusting his moral and social functions to meet the ever-changing requirements. True history of ethics, and sociology, should be a record of these changes from century to century. Read aright, they are milestones on the road from absolute superstition and ignorance, toward the correct solution of natural cause and effect. It is gratifying to know that so many authors of ability have already written as Buckle has done. Many of them have greatly broadened his ideas

The President of a certain college, in a lecture,

lamented the fact of a tendency of the Anglo-Saxon, towards skepticism of God and immortality; and that, in this matter, it was better to borrow the faith of the Latin races. He did not add that at the same time it would be, also, necessary to borrow their consequent moral and physical degeneration. The one condition cannot be borrowed without the other. For when an individual, or a race, transfers the cause of its perpetuation, and growth, from its own effort and exertion, to the favor of the supernatural, it has already sown the seeds of its own senility. But the superiority of the Anglo-Saxon is a superiority of intellect developed by work; and this means a truer perception of natural cause and effect. It is simply impossible for a race of men to avoid, in the evolution of intellect, a corresponding change of beliefs. They are simultaneous, and unavoidable. This college President may just as well ask the mature man, to retain the beliefs he had as a child, in the objective reality of nursery tales. It is psychically impossible.

Man's relation to his environment should be determined by the images made upon his brain centers by real objects. Other impressions are hallucinations. He thus only will recognize whence his organism derives all its power,—whether called physical, mental or spiritual.

My idea is that the fatal error in former civilizations, as well as in the present civilization, is in popular ignorance of the natural laws of the Cosmos, and that the civilization of the future will be enduring in proportion as it makes the natural its foundation and the basis of its educational systems, and adopts the idea that from phenomena properly understood men can derive the highest knowledge, and the most endur-

ing ethics. From these will arise a form of society whose laws, by bearing equally upon all individuals and classes, will postpone indefinitely any desire for change. Thus will come an enduring nationality and an unchangeable civilization, at least a very decided change toward permanence.

The theological conception of creation, that man was created perfect after all other things had been created for him and his destiny; that the earth was the center of God's special care; that the sun, moon, and stars revolved around it for the purpose of contributing to the pleasure and welfare of man, or that the earth is a mere resting place to prepare him for a purer life beyond, is what heretofore has technically been called the geocentric idea. But my conception is that the term can be much more properly used in defining the true source of knowledge and inspiration, the real cause of man's religion and happiness. While science has long ago shown that the earth is not only not the center, but a very small and insignificant part of the universe, yet it is the abode of our race; for mankind is confined to it irrevocably, and from it and its natural productions must derive his life and everything that contributes to the support of life. The term life includes both physical and psychical. It is therefore of the greatest importance that man learn all he possibly can of this source of his existence. The highest education is that knowledge which puts the Ego into the closest touch with his proper relations to all of his immediate environment, in and from which, the elements of his body and being are evidently derived. Therefore, the geocentric idea is correct scientifically; but not in the old theological sense.

Man must understand that he cannot transfer his

growth and welfare from his own efforts to keep in correspondence with a material environment, to a supposed personality who will look after his welfare for the mere asking. "It is impossible for artificial molding to do that which natural molding does. For the very essence of the process, as spontaneously carried on, is that each faculty acquires fitness for its function by performing its function; and if its function is performed for it by a substituted agency, none of the required adjustment of nature takes place; but the nature becomes deformed to fit the artificial arrangements instead of the natural arrangements." "Principles of Ethics," Herbert Spencer, p. 259, Vol. 2.

My understanding of the religion in China is that Confucius, whom the Chinese follow, did not teach a personal God, nor personal immortality. Therefore, the Chinese are not much saturated with the supernatural. It is the same with the East Indian. His Nirvana, while professing to be elimination of evil, yet is practically annihilation at death. If the above definitions of the beliefs of these ancient peoples are correct, then they will exemplify, by the long reign of their peculiar civilizations, and the principles here set forth, that the further removed the beliefs of the people are from the supernatural, the more enduring their civilization will be.

Hobhouse, in giving the gist of the Chinese religion, says, "Man is not inherently bad and redeemed from evil only by divine grace. In himself he is potentially good and the germs of good in him only need favorable circumstances, teaching and effort, to come into perfection; that all along the rich valleys with their million homesteads the husbandman may reap the harvest he has sown in fields unstained by blood; that

he may cherish wife and child and be nurtured by them in age; * * * that wars may die away; that crime may be repressed, not by punishment but by the example of virtue. * * * Not for the glory of God but the peace of man is the aim." This is not Buddhism nor monotheism. "To live in the service of mankind, to respect parents and superiors, to be kind and helpful to those in need, to have no enemies, to be prepared to love all men, to hate only those who slander others * * * to undergo privation and if necessary death for a moral purpose, to be grieved and feel pity for the criminal instead of trampling him, not to withdraw from the world; to realize that man's life is to be lived in the midst of humanity, whatever the difficulties and drawbacks may be; and in all these things to recognize that the beginning and the end is sincerity. Such is the ideal of personal conduct that Confucius gave to China." Confucius did not claim to be a God, nor the son of one. The natural life of this world taught by him is not sufficient for the votaries of Christianity. They teach that one must be dead to this world, and live only with reference to another world and the glory of God.

The following extract is made from an article written by the British minister, Sir Robert Hart, at Peking, China, on the "Boxer movement." It is a representation of a civilization that is older than ours; which centuries ago passed through our present mental habits, and have forgotten them; and in which Christianity, as a system, has not been an element. But the Golden Rule was a cardinal principle of it.

"The Chinese are a proud,—some say, a conceited,—people, but they have very good reason for their pride; and their conceit has its excuses. Far away

from the rest of the world, they have been living their own life, and developing their own civilization; while others have been displaying what humanity may attain to with a revealed religion for its highest law, and a Christ for its pattern, they have been exhibiting what a life a race may rise to, and live, without either. The central idea of their cult is filial piety; reverence for seniority, intensifying with every generation that transmitted it, settles all the details of the family, social, and national life. They are a pre-eminently reasonable people, and when disputes occur, it is the appeal to right that solves them. For thirty centuries, or more, this recognized, and inherited, worship of rights has gone on strengthening, and so strong is the feeling, that to hint to them right must be supported by might, excites something more than amazement. The relation of sovereign to subject; and of man to man, have so long been authoritatively defined and acknowledged, that the life of the people has been poured into and shaped by a mold of duty, while the natural division of the empire, into provinces, has been so harmoniously supplemented by provincial and inter-provincial arrangements, under the metropolitan administration, that law reigns everywhere, and disorder is the exception. The arts of peace have ever held the first place, in the estimation of all, and, just as might should quail before right, so does intellectual prowess win honor everywhere; and the leaders of the people are those whom the grand national competitive examinations have proved to be more gifted than their fellows. In no other country is education so prized, so honored, so utilized, and so rewarded; and such is the veneration for that simple vehicle of thought, the written character, that to tread on paper with either writing, or printing on it, is all but desecration.”*

The Chinese religion included the essential tenets

* “Popular Science Monthly.”

around which the Christian religion crystallized, viz., the Golden Rule and the natural ethics of the Sermon on the Mount, the latter shorn of its interpolation of supernatural ideas. These are the foundation stones of every religion, and the same principles are exhibited by every atom of matter in the original nebula, from the time of its first movement toward the integration of the present forms in the universe, until men and animals were evolved on this globe, from the same atoms, still governed by the same principles.

Here is a recognition of the law of evolution in the formation of society and morals by Lao Tsze: "The wise man says, 'I will design nothing, and the people shall shape themselves. I will keep quiet and the people will find rest. I will not assert myself and the people will come forth. I will discountenance ambition, and the people will revert to their natural simplicity.'"

Why do I say that an emancipation of the human mind from supernaturalism will bring about a better civilization? Because the authority now assumed by a minority on account of it, called by them a divine right, will have no further support. The most potent class of these is the priesthood, for they are controlling most educational institutions and supporting the unnatural division of classes as they now exist—the rulers and the ruled, the masters and the slaves, the capitalist with his power over the wage-earner. No man should be able to say to another, "You must believe a creed, because I say it is correct, or you must not inductively investigate those things which I call sacred, nor deny the binding force of a book which recognizes slavery, polygamy, and monarchy, with war." Men can be free only when such a state of

society passes away and when every belief, every overt act, every code of conduct, every thought of man shall be validated by experience only. When these experiences shall be codified into laws in which every citizen has a free voice, untrammelled by authority, then will there be a code of ethics for the benefit of all; not for the purpose of allowing the few to exploit the labor of the many. Then will arise the better polity of nations as to the natural rights of man, when all caste and special privilege will pass away. The church in Europe always taught that hereditary monarchy was divine and inviolable.

Gibbon, in his "Decline and Fall of the Roman Empire," makes the following statements. "Julian recollected with terror the observation of his master Plato that the government of our flocks and herds is always committed to beings of a superior species; and that the conduct of nations requires and deserves the celestial powers of the gods."

"In the general order of Providence, princes and tyrants are considered as the ministers of heaven, appointed to rule or chastise the nations of the earth."

"The Kings of Judah derived from the royal unction of their great ancestors an hereditary and indefeasible right, which could not be forfeited by their own vices, nor recalled by the caprice of their subjects." This is the principle upon which every king who has ruled since then based his royal rights. The Providence who established the Jewish monarchy, being no longer confined to the Jewish people; when Constantine conquered the world, over which Christianity was then spreading, the high officials of the Christian church assured him that he was chosen of heaven to rule the world. So it has been ever since. The conquerors

of the world have been the chosen ones, the Christian church being their sponsor.

The Church of England always held, to use the language of Macaulay, "that the right of the House of Commons to share in the legislative power was merely human, but that of the king to the obedience of the people was from above." It taught, therefore, that the ordinance of man was powerless to change the ordinance of God. Even the Declaration of Rights adopted at the revolution of 1688 did not change these ancient laws. Not a single right was given to the people. And this was England's last revolution. The ancient divinity and indefeasibility of the monarch still holds with the majority of the people in the twentieth century. What a comment on the slow evolution of the natural and rational from the supernatural and from superstition! It is evident that economic questions,—the struggle of wage-earners against the capitalists for the improvement of their conditions,—are almost impossible when capital is organized and almost universally supported in and by the church and supernaturalism. Nor can the land question along the lines advocated by Henry George make much headway, while the organized theologians are the greatest land owners and supporters of the present system. These facts account for the growing protest against theology and supernaturalism in the ranks of what the French call the "proletariat." The church seems to them organized in the interests of "system"—in monarchical countries it supports monarchy, in a republic, capitalism, or whatever capitalism desires. This is the way the laboring man is now looking at it. The theologian answers this by saying, "We teach the love taught by Christ, the Golden Rule, the Ser-

mon on the Mount, equal and exact justice to all men." "Yes," says the laborer, "those things we believe in. But they are generalizations that do not practically operate to found a system of human laws, or economics, that will work reform in industrial society. Our attention is too much occupied by these general ideas, and with hierarchical doctrines, to enable us to give proper time and attention to education in the science of society, ethics and economy. What I want is equality of opportunity in practical affairs, and the laws of my country so framed that a few brainy and unscrupulous men cannot monopolize the earth, air, and water, so that the rest of mankind will have to pay tribute to them for all time. These are more important to me than theories of supernaturalism, or commands, to pay tribute to Caesar, or that servants should obey their masters."

It is the habit of some to attribute to supernaturalism, that is, the creeds of the Christian church, all that is good in the civilization of the world. But I think it can be shown from the teachings of Jesus that there is no original, automatic initial force in them; that whatever is good in the Christian religion,—and no man can deny that they embody as the support of their tenets, much that the world cannot do without,—is rather the offspring of a condition of society, that has resulted from a much broader principle existing in the very necessity of the interchange of matter and motion, from the very beginning, and continued in that form of it which we now call man. Any religion is the result of civilization, not the cause of it. Jesus used the parable of the seed and the sower; and said that the seeds that fell upon the rocks did not produce; and that which fell upon stony

ground, sprang up, and soon died. So that the seed (that is, the Christian principle), if the illustration means anything, has no initiative power within itself. The seed had no power to transform the rocks into soil, or the stony ground into productive earth. This was done by natural forces. It must be sown on good soil to bring forth fruit, and this depends upon natural law, not supernatural initiative. So that, the important thing to know is how comes the good soil,—the condition of society that makes the principles of Christianity, that is, the altruistic principles, able to take any hold of the people. The growth of the seed of any religion, or morality, depended upon the condition of the people mentally.²¹

It is singular, to say the least of it, if the Christian religion is the maker of our civilization, or is any more than a factor in the result of it, that it was not introduced into the world by the All Wise and Omnipotent in time to produce the earlier civilization of Assyria, Babylonia, Egypt, Greece and Rome. When it first began to spread in Rome, that world power, says Gibbon, was just turning to its decline. Thirteen hundred years expired before its final fall, at the absorption of Constantinople by the Turks, who were Mohammedans. But it was powerless to arrest the decline and fall because it had in itself no such power. Nor could it hold the center of its origin from its great rival Mohammedanism, for the same reason. If it had the power behind it and that power was really the creator of all things, then is it unreasonable to ask why it did not spread from Palestine, in increasing circles of religious and moral conquest, to all points of the compass, beginning with Arabia and Egypt? But Arabia never did adopt Christian-

ity. It has spread during the centuries, but so have Mohammedanism and Buddhism and Confucianism. By this test it cannot claim to be an exclusive creator of civilization. As a religion, I very much prefer Christianity to any other, because I know more about it, and because it is the prevailing religion of our civilization. But it is not the maker of that civilization, any more than the others are the makers of the civilization in which they abide Abercromby, in his "Seas and Skies in Many Latitudes," publishes two maps. One shows the area of the reign of the Mohammedan religion, and the other the region in Asia and Africa where the rainfall is not more than ten inches. In boundary they are strikingly alike." I think Christianity is an evolution from the psychology of the time and people, when and where it sprang, and that ever since it has been undergoing changes, as the psychology of the people changes; and instead of its being the creator of the psychological condition of its origin and progress, it is the creature of both a natural biological and psychological evolution. Its founder would not now in the United States recognize his offspring, and the Christianity of a thousand years from now, would be still less recognizable by us. It was not able to keep its own organization from becoming corrupt, and could not prevent the darkness of the middle ages, when the church had the most power.

The state of suspense and skepticism regarding the pagan religions in the Roman world, at the time of the advent of Christianity, made its progress there a matter of natural evolution. For the natural love of the marvelous and mysterious in human nature everywhere, which had favored the establishment of polytheism, now, upon the decline of the latter, made

the more plausible tenets of Christianity doubly sure of acceptance. So when the natural religious psychology of the Roman world at that period is once understood, then the wonder at the spread of Christianity will pass away.

Gibbon estimates that about one-twentieth of the people became Christians. While polytheism was a natural outgrowth of the Roman civilization, and while Christianity was just as surely incompatible with that civilization, yet we must remember that Rome was then on its decline and the civilization which followed, down to the fifteenth century, was one in which Christianity, as organized and perpetuated during that transformation, was the potent and prevailing religion. It did not mold that civilization, it fattened on it and grew to power, as the people declined into the darkness of the middle ages, like a vine that deadens the oak around which it clings, while the oak draws its waning vitality from the soil in which it is rooted, and from which it drew during its whole existence its power and strength. So does every nation, or state, draw its real vitality from the material elements in which it is rooted. Its religion is a parasite, that may vary or change, but the civilization remains always, first as well as last, rooted in the soil.

Gibbon in his justly celebrated 15th chapter of "The Decline and Fall of the Roman Empire" gives several causes at length for the spread of Christianity in Rome and the Western Empire. Some of the causes pertain exclusively to the spiritual and supernatural doctrines, and others to merely moral and social functions. All the causes are treated relatively to like conditions in the Roman polytheistic religion.

The latter are shown to be less attractive to the emotional imagination of the common people and less calculated to improve their economical or physical condition. The Christian theology held out the hopes of another life in which the hard conditions of this, which it declared would soon end, would be amply compensated by a heaven of eternal bliss. The Christian organization extended charity, without inquiring into the cause of pauperism. They led a moral and ascetic life in contrast to the immorality of the pagan.

The Jewish Christians were very zealous. They devoted their whole time to the government of the church and withdrew from any active participation in the duties of Roman citizenship. While this alienated the Romans and begat hatred toward the Christians, yet it attracted the poor whose miseries were only indifferently relieved by the pagan authorities.

In short, the very nature of polytheism, its many gods, its loose creed, served to dull the enthusiasm of its nominal devotees. The Roman people had evolved into an intellectual state incompatible with so superstitious and fanciful a conception. And when a monotheistic doctrine was presented, in the pathetic attitude of lowly origin, self-abnegation, zeal before never heard of, offering immortal life to all who would believe, and proclaiming the near approach of the end of the world, it is little wonder that the lowly and some of the mighty, like Constantine, abandoned such gods as Hercules and Apollo, and became sectaries of Christianity.

As the Christians increased in number, the bishops and presbyters began, slowly at first, but with consummate ability, to organize an ecclesiastical system, which in the course of centuries grew into the

Roman Catholic Church, a power that held through the middle ages and until the present age, or until Protestantism rose as its negation, the religious, and much of the time the temporal world, in the strong grip of reactionary superstition. But Christianity as a power was limited. It found slavery wherever it spread, but could not abolish it. It found monarchy and oppression everywhere, yet it has never succeeded in establishing the equal rights of man. It, of course, advised, through the church and priest, mitigations of crimes, better treatment for slaves, etc. But as a real power emanating from an omnipotent divinity it failed to have any more power than was already being exercised by such sects as the Stoics in Rome, and by the natural laws of human society, which produced as time passed greater and greater changes for the better in human society. Both the natural laws of evolution and the supernatural laws of Christianity made changes only by virtue of the natural evolution of brain power in man,—only so fast as the senses of men were enabled to perceive that the aggregate welfare of mankind could be improved only by the natural working together of certain biological and social forces called by the generic term “righteousness” or “goodness.” If the divine power of Christianity had changed these biological and social forces so that all individuals and social communities became at once righteous, doing the right and just things at all times, then it could justly claim supernatural power of initiative. But as it has to depend upon the slower processes of natural evolution, it cannot claim supernatural, but only finite human power. None of the forms of belief in the incarnation of God, such as the immaculate conception, atonement, and

bodily resurrection, make their appearance in Christianity for the first time. It may be that the adoption of supernatural religion is of such necessary psychological tendency at a certain period in the development of a people that they unconsciously adopt it without knowing, or thinking, of its more ancient existence in some other form. Yet it is apparent that it must be a natural evolution in that the roots of it penetrate, in every location where it appears, former modifications of the same belief in older religions.

It can thus be quite confidently asserted that such beliefs, permeating all religions in very much the same form, but conceiving different personalities, in one the Buddha and in another the Christ, and in another some other form of the same idea, are merely subjective conceptions of the brain, having no reality for their foundations. Otherwise, the one true creator and omniscient ruler would surely take the pains to reveal himself by correcting in the brains of his worshipers the immense delusion under which some of them, at least, must be laboring. Religion does not seem to have been a ruling factor in the social bond, the tie which binds together the individuals of any social community and at the same time separates them from other social units. The belief in ghosts of some kind characterizes all forms of society. But certainly at first and for a long series of integrations of the gentes, clans, tribes, and finally of nations, kinship is the first and important factor in the bond; then the necessity of combining for defense and mutual aid; then citizenship and authority. Religion is a growth, more parasitic than otherwise, which at times assumes a center of authority by which certain social units are kept together, yet it is not fun-

damental like kinship, and later the similarity of food production, or economics. Religion was more or less a personal matter and its form depended upon the development the intellect had already acquired by the struggle for existence, and the activity given the brain by the real forces that go to the formation of the individual and of society.

People who had followed unconsciously the law of evolution and kept close to the lessons taught by nature, that the struggle for existence, and the survival of the fittest, were the only methods of developing a strong people, were the ones in which the altruistic seed could generate. Those races in which the individual was made strong by honest work, by agriculture in the first instance, and then by other industries as they arose, manufacturing and commerce; were the ones where Christianity made its strongest impression. But a people thus prepared by the cultivation of all those mental traits that result from honest physical toil, in other words, from the struggle for existence, were already moral and religious. They might not all be refined and intellectual, but they must be just, or they would have no prosperity, they must be temperate, or their development would be arrested; they must be virtuous, because labor suppresses the passions, they must be happy, because happiness consists in the satisfaction that comes from the ability to overcome the difficulties of life; they are independent, because individual effort in the industrial pursuits brings self-reliance, which is the essence of independence. They adopted the supernatural in the Christian religion together with the natural ethics so ingeniously woven with it, because they lacked the power of analysis to separate the two ideas. The

preacher of salvation seemed to have hypnotized them, with his solemn voice and demeanor. The ceremonies of the church are very attractive to an imaginative people who are not in the habit of burdening their thoughts with those subjects which the priesthood pronounced divine with such fervor and mental power.

The intellect, the emotions and the instincts at the maturity of man have so strengthened themselves by constant exercise and habitual reaction to external stimuli that they at times seem to have an automatic power uncontrolled by environment. They react upon the physical structure in physiological ways, mostly pathological, so as to produce certain visible effects, for example in modifying the bodily secretions. What are called religious emotions seem to have the effect of controlling the will power of the individual in certain moral aspects. But this is always within certain physical limits, and in no instance does it lift the individual or society above the direct and all-controlling influences of the physical environment. It never takes the place of the activities of life, of the necessary correspondence of the organism with its sources of sustentation and perpetuation. There must first be a physical basis which is purely biological, and however spiritual, in the biological use of that word, the individual may become, that never can precede, or take over to its own automatic reaction, the fundamental, imperative, and primitive connection of the psycho-physical organism with its material environment. Could, in any way, this connection be destroyed and the activities it necessitates cease, all the emotional or purely intellectual reactions would also instantly cease. Therefore, there is no more than a

secondary and derivative power in any purely religious and moral code in the making of character and the formation of a civilization. The advance from animism or fetishism to polytheism, from that to monotheism, and the probable change eventually to naturalism, has not been caused by the initiative of religion or supernaturalism, but by the force of intellect evolved by science, and the struggle for existence. Every step in advance has been forced by the discoveries of science and will be in the future. Had not reason grown, and knowledge of nature increased, mankind would still be startled by every appearance of a shadow, and looking upon dreams as the wanderings of the other self. The further evolution of reason will dissipate the idea of a supernatural cause and will show that all effects or phenomena are produced by natural laws."

The Anglo-Saxon race has made itself the ruling power in the world because it has made human labor and the homely virtues growing out of that necessity the basis of its civilization. It began in England by fastening itself to the soil with a tenacity that the Norman and Danish conquerors were powerless to break. Then when manufacturing and commerce were made immensely expansible by the use of coal as fuel and the invention of the steam engine, their activity, strength and self-reliance, which had come to them from their former agricultural pursuits, enabled them to seize the wonderful possibilities for success in these arts. But the religion and morals of the church alone could not have enabled them to do this prior to the refining and toning influences of tilling the soil for food, and not roaming as mere hunters and despoilers. The hardy experience acquired by

industrialism in contrast to militarism in local communities gave great impetus to the nascent civilization. It was intelligent, honest industry which brought first brain and muscle, then independence, then leisure for mental training. In other words, it was the religion that nature taught them by her unchangeable laws, so true and beautiful, so well adapted to the welfare and happiness of man. The change from wandering hunters and warriors to localized farmers and manufacturers gave a character and thoughtfulness to peoples. This of itself was the religion of the Golden Rule. The shifting tribes of Arabia never did adopt the tenets of the Christian religion; and are far from convertible at this time to the practice of the Golden Rule, because their habits of life are incompatible with it. Their form of society is militant, not industrial. They did not produce, but conquered from industrial peoples their means of sustentation.

Before the ancestors of the Anglo-Saxons became farmers and manufacturers, they were mentally in the condition of the Arabs of Asia and then Christian tenets were blank to them. They are the stony places where the seed fails to bring forth fruit of its kind. The point is, that when the seeds of Christianity bring forth fruit, the people have already evolved into a natural religion which if continued, as a natural evolution of morality, and religion, would require no superimposed supernaturalism to make it strong and enduring.

Norman kings annoyed the peaceful Anglo-Saxons of England somewhat; but their agriculture had made them patient and thoughtful. The struggle of the people against the claims of rulers, that began with

thinking; and therefore the more rapid emancipation toward naturalism, or phenomenism, have been greatly accelerated by the omission in our constitution, and laws, of those organized and legalized oppressors of the people—royalty, and a state church. Our land laws also are much better for the people. The facility of acquiring agricultural land in the United States is a great incentive to the European landless man to emigrate to this land of opportunity. Those who can thus acquire a home, at the same time obtain with it the right in time to a voice in the local, state and national governments. The wrongs that may exist in such political bodies may be righted by the united action of the voters, because there is no king or state church beyond the reach of the voting franchise to perpetuate such wrongs. What an immense advance these rights give the citizen, over his condition in any monarchy of the old world! I wonder now, since the president's famous order withdrawing coal lands from public entry, and especially since the famous anthracite coal strike, during which a certain coal proprietor made his famous remark about God's putting the coal lands in the hands of the capitalists, for the benefit of the workers, whether if all the land were again in the ownership of the government, a new land policy would not be adopted whereby the ultimate title would remain in the government, subject only to the actual occupation, and use, by individuals. Especially should the metals, minerals, and oils remain the property of the whole people, and be leased by the government for the benefit of the whole people upon royalty.

There were some of the inherited English defects quite apparent in certain classes of colonial society, at the time

of the formation of our constitution. Hence, the compromises of the constitutional convention, by which African slavery was continued and advantages given the employers of labor, by the use of the protective principle, in national law. Yet it was an immense advance toward individual emancipation, when a state church, royalty, and an hereditary upper house were omitted in the original constitution. But even with this advantage over the mother country, the further evolution of the people of the United States toward complete emancipation, from theological and economical delusions of all kinds, depends upon the same material causes that have heretofore produced the superiority of the Anglo-Saxon race.

We have in this country, for the reasons given, a fairer field for the betterment of life conditions, than exists in any other nation. But constitutions and laws do not produce the negations of present social processes. They are effects, not causes. The cause lies in the individual, in his relation to society. There should be a better conception of this relation. The true causes, of a better civilization, must be comprehended and acted upon before a government of, by, and for the people can be fully established. The materialistic forces that mold society into mutual burden bearing and equal profit sharing individuals must be brought into practical operation. Special privileges to a few, by divine right, must give way to the equality of all, before the law. The idealist's contention that the "better class" shall rule the ignorant, and less endowed; and determine arbitrarily, how long the latter shall be kept from self-government, must give way to a community of material interests, in which the wage worker shall be beneficiary in propor-

tion to his contribution to the material accumulations, according to exact justice, and not according to the will of an arbitrary minority. All the ideas, that the rights of franchise should be based on book knowledge, or wealth, or color, or sex, are monarchical, and not republican. Special privileges of all kinds should be absolutely abolished.

But the compromises of the Constitution, by which African slavery was recognized, and by tacit understanding at least a number of states retained, and fostered it, proved to be an immense impediment to that impulse to a higher civilization, which a republican form of government gave to the people. It finally required a civil war of great magnitude, and very great destruction, to correct this mistake. If this were a treatise on economics, I would further comment upon this idea in the following way. The civil war was not only justifiable, but necessary, in its results, viz., in correcting some of the mistakes of compromise. And while it abolished slavery, as it then existed; and established the cohesion of the states, into an indissoluble union, which cannot be overthrown by secession, yet it was followed, whether causally, or not, by another form of slavery that ever since 1865 has been growing in intensity and magnitude, viz., wage slavery. The productions of the laboring classes, in both commerce and manufacturing, have been going into the coffers of the capitalists in increasing ratio, until the eyes of some people have been opened very wide. The railroad strikes, the coal strike in Pennsylvania, the beef trust, the sugar trust, the Standard Oil, and the immense rebates, and corruption funds have finally compelled those in power to study up the fundamental prin-

ciples of "a government by the people, of the people, and for the people." It will be discovered, too late perhaps to avoid another conflict, that our land laws in many respects, and our economic policies, are not competent to build up a free democratic commonwealth, in which the weak are protected against exploitation by the strong and cunning. Our land laws have given the most precious sources of wealth, the minerals, and oils, beneath the surface, without sufficient compensation to the people, into the hands of private monopoly. Too late the policy of forest preservation, and the consequent conservation of water, has been timidly adopted. Agriculture has been better conserved for the benefit of the people, yet the policy of the government in allowing the title, in remainder, of the land, to the people to pass into the absolute possession of individuals in fee, will eventually result in a land aristocracy, and a landless, poverty stricken class, who will remain poor, for the want of a footing, by right, upon the earth. These mistaken policies will eventually establish, what now exist in a less dangerous degree, classes, and class conflicts, which may have been prevented, to some extent, at least, by incorporating into the constitution such law for the distribution of the public lands, and their underlying contents, as indicated above.

But government, having disposed of the land, and its contents, cannot now recover the title. Is there any way in which this immense mistake can be counteracted in its effect, on the welfare of the masses? I can now see clearly, that society and government cannot go backwards. The present conditions of economic production cannot evolve into the old individualistic, nondivision of labor. It must develop in the

direction of the most economic transformation of material into the finished product, i. e., the expenditure of the least muscular labor, in mere physical production, and more consequent leisure for the exercise of the brain in intellectuality. How shall this be done in the interest of the whole people, except by construction of economic law, by which a better distribution, of the product, shall be accomplished; and at the same time a suppression of the aggressions of ignorance and revenge? The power of the majority, when they rise to the control of organized government, must be tempered with justice to all, and the feverish anxiety of those unused to the exercise of power, to unnaturally hasten the march of reform, when once the control of the economic and political forces are in their hands, as was the case in the reign of terror in the French revolution, must be counteracted, by the admission into the rule of the nation a proportionate representation of the minority. It must be in the nature of an economic Hague conference, absolutely devoid of hatred and revenge, where reason, justice, and firmness shall control. No force, nor threats of it, should enter into this discussion. The pending struggle should be, to establish the principle that every individual should receive the full benefit of that which his individual labor produces. There must not be either chattel or wage slavery. Nor must there be unnecessary militarism. But all real progress in either mental, or moral development must necessarily be founded on the material, or physical necessities of both individual, and race preservation. This means that all lawabiding members of the community shall have a legal footing upon the earth with equal opportunity, in the struggle for existence. It is a

problem to be worked out from very mixed conditions

The strongest hold that theology has, upon the masses, is that it has wisely embodied in its mysterious supernatural creed, an ethical code, which, while not scientific, but authoritative, yet is assented to by scientific thinkers, because of inability, of a large part of the people, to comprehend any other code. Much of the decalogue, and the Golden Rule, are natural codes of morality, which every people are compelled, as a matter of self-preservation, to adopt. They would have adopted practically the same ethics, had the idea of supernaturalism never existed. The idea seems to prevail that if the myths are swept away, the moral code will go with them, and the people will be left without a guide. But a moment's thought will convince any one that if the change is made by the slow process of education; that is, by reflection, reading, and a personal study of the facts of nature, the same way the scientists have convinced themselves, that the same power of brain that has thus uncovered the untruth, will see that natural ethics are essential to the preservation of, not only society, but of life itself; that whatever is embodied in the theological code that is natural, and essential to man, will remain when all myths fade away. But natural ethics are inherent in the nature of man and society. They need no supernatural sanction for their enforcement. Life, and especially what we call social welfare and progress, cannot be maintained without a moral code based upon the laws of evolution. The gradual change that comes into the minds of trusting childhood, for instance, that believes anything it is told, as education teaches it to discriminate between

the real, and the unreal, is typical of the change from the supernatural creeds to natural fact that will come into the aggregate mind of mankind, as the real facts of natural phenomena become apparent. Minds that are uneducated in scientific truths, are in the condition of childhood,—they are ready at all times to attribute what to them are unknown mysteries, to a mysterious origin. Childhood is typical of primitive man; that is, of the condition of mankind prior to historical time, and of what we now term the barbarian. In fact, scientifically, the various stages of the individual development of man, from the single cell in the embryo, all through its growth from the embryological period, in the womb of its mother, and after his birth, through babyhood and boyhood, up to what we call the fully developed man, are typical of his racial (phyletic) physiological development. It seems that our ideas of natural cause and effect are derived, primarily, from the activity of our own organisms, as causes. Our ideas of energy are derived from our sense of effort, in overcoming resistance. The unscientific reasoner therefore would naturally attribute all effect to a like personal cause. From this idea he infers a personal creator. In fact, it is the essence of the theory of the immanence of the Spiritual.

But when we come to think of it, how little less primitive was the prehistoric man, than the one, who now attributes the origin of natural things, to supernatural causes. The man who lived in a cave, who wobbled in his walk, and had no written language, very likely did that. If the brain of man has developed, in proportion only, as man has placed himself in correspondence with the relation of things in the

environment, that is, as he conformed his habits or functions to the laws of nature in a wider sense, at each step of improvement of brain structure, any impediment to that correspondence like his attribution, without thought, of all phenomena not understood to a supernatural cause, would greatly retard his mental development. Being satisfied with such conclusion, no effort is made to discover the true natural cause. His comprehension of these laws enlarged, only as his brain structure enlarged. Man only gradually acquired the ability to stand erect, and slowly acquired a language, in which the better observers could communicate to the duller ones. But the time he gave to the vague ideas he may have had concerning the supernatural cause of phenomena, did not aid him in acquiring these important functions. It was the exertion of all his natural energy in the direction of natural laws, and material things palpable to his senses, that accomplished these changes.

The theologian treats the mind as an entity that should rise above nature; he assumes that the supreme realities of life are out of the realm of physical science. That is true, only if the mind is specially created, and put by a supernatural power mechanically into the body, and is a thing not depending on material support. But if, as seems more probable, the mind is the aggregation of feelings resulting from the sensations aroused by objective realities in the environment, and has been evolved in, and of, and with the body alone, by the evolution of matter, in the form of nerves as numerous as the pores of the body, as multitudinous as the arteries and veins, then, it at once becomes apparent that it is not an entity; that it is as absolutely impossible for the mind to control nature, or rise independent of its laws, as it is for the body to exist

without material sustenance Mind is function of nerve tissue. Science makes no mystery of it. If mystery is what the theological mind desires to feed on, it need not go beyond the apparent phenomena of Nature. It will find it in great abundance in the material universe, in phenomena whose cause is yet unknown.

Rev. William Chester, in his book, "Immortality, a Rational Faith," says, "Of course the question of immortality is out of the realm of physical science. So are all the supreme realities of life.—God, the soul, the moral sense, the affections, the beautiful, the true, and the good." That is a singular combination of entities and attributes; of final causes and effects, of the abstract and the concrete. A reality is something palpable to man's senses, by its attributes. Will not any intelligent student of physical science admit the physical reality of "the moral sense, the affections, the beautiful, the true, and the good?" These are palpable attributes of the human organism; and some of them of all nature.³⁴ The physical scientist will also admit, that "moral sense, affection, the beautiful, the true, and the good" are immortal. These are effects, not causes, and are attributes of matter and motion, and in no sense entities like Mr. Chester's conception of God and soul. Prof. Hæckel, the advanced physicist, admits a soul to every atom, and that this soul is immortal. But probably this is not the soul meant by Mr. Chester. The atoms, also, have affection and the extreme "moral sense" of choosing at all times to do the "true" thing for an atom to do, which is to make the most "beautiful" combinations with other atoms, for the aggregate "good" of the universe, including man. So that these things are within the "realm of

physical science." If he means by "God" the aggregate "good" within the comprehension of the best intellect, then that also is within the realm of physical science. For it is within the conception of our combined physical senses, which is part of consciousness, that whatever occurs in the realm of physical nature is for the best.

Of the same class is an immense amount of current theistic literature, the ruling idea of which seems to be, that it is perverse of morality, and sanity, to desupernaturalize the thoughts of the people. In doing this it is assumed always that it is natural for the human brain to recognize, by intuition, a personal ultimate cause. The reconciliation of the latter with the scientific definition of cognition always discredits the power of the epipheral sense organs, as a criterion of knowledge, and assumes that there is even a more reliable source of knowledge in what is vaguely termed "intuition", knowledge without experience. There is also almost always either a direct, or indirect, reference to the reasoning of Spencer's first part of "First Principles" in inferring an "unknowable absolute" from the relativity of all knowledge. But no scientist, nor logician, will contend that because the brain, while seeing and feeling any form of matter, also has the same convincing evidence of the metaphysical ultimate cause of all things, that it has of the form it sees and feels. In other words, the evidence of our senses by means of which we know things is altogether wanting in our conjectures about supernatural entities.

I believe it to be true that if we confine our data to the historical experience of the race, we shall find that mankind has not been able to keep in sufficient corre-

spondence with phenomena to avoid a subjective conception of a supernatural. It has not been able to formulate a code of natural ethics for want of intellectual ability to connect observed effects to natural causes. In this sense I might say that the existence of the belief in supernaturalism has become inevitable, through natural causes. Because naturalism assumes two aspects of equal importance in psychology, the subjective and objective in necessary correspondence. If the correspondence is so defective, for want of a proper apparatus for maintaining the subjective aspect, I suppose we must still call the subjective conception natural, although it is not true objectively. This is a phase of what may be called abnormal psychology, in the evolution of the human brain. It is difficult enough for science to form even a tentative hypothesis that is satisfactory, or adequate, regarding phenomena. It is impossible for it to investigate the supernatural, for that is the realm of the unknowable.

If all would or could agree that everything is natural, that nothing has ever occurred in opposition to, or under suspension of, natural law, then the scientist can remain a realist, or materialist, and the theist can go on believing that the persistence of force is only another name for personality, and both can respect each other. Both should have the same end in view, viz, the attainment of truth, and man's conformity to that.

It is true the scientist cannot carry his experiments beyond the sensuous,—he cannot trace phenomena to any cause beyond the phenomena. Neither can the theist. But the latter may indulge his faith to any extent. Therefore, why cannot both agree upon that fact, and confine attention to phenomena only,—the

former being content with phenomenism, and the latter with personality in form of mind, or spirit, as first cause?

The human mind with all its material helps, such as microscopy, telescropy, spectroscopy, photography, which is proving in later days the most effective, has not yet discovered, except in the imagination of the theologian, a place the mind could rise to, and get above nature.

Another thing we must remember, in the discussion of this important question is, man is a late and the youngest product of nature. The largest part, and perhaps the whole of the visible universe was here long before man was evolved. If he is a product of its matter and motion, then it is essential to his very existence, that he conform to its laws, and it is apparent that the more perfectly he is in correspondence with these laws, the less pain, disease, and discomfort, and the longer life he will have. Is it not possible that if this correspondence could be made perfect, his life might also correspond in length, with that of other phenomena? Disease is a breakage of this correspondence. Death is a complete cessation of it.

Now, what lesson does this teach? That his ethical or moral code must consist of that line of conduct that will tend to increase the complexity, of this natural correspondence, from the mere capacity to procure sustentation, shelter and exchange of products, to the brain power of abstraction and generalization;—the power to form the subtlest moral judgments. In other words, he must derive his true conception of right from the natural, and not from the supposed supernatural. When his habits are in correspondence with the evident requirements of nature, then he is

moral. He sins only when he violates the laws of nature and he suffers the consequences, viz.: pain.

This principle when elaborated, so as to properly apply to all the relations that man sustains to nature, and his fellow man, will be found amply sufficient to account for, and sustain, the most altruistic conditions ²⁵ It will account for the most abstract, and apparently disinterested love, that man can have for others. But a proper observance of the principle will prevent what is likely to occur under a code of ethics not so founded, the weakening, and final breaking down of the race. That is, Nature teaches by the survival of the fittest, that the species must not and cannot survive if the weak, or unfit are perpetuated. If a man is to build up a strong race, which alone is worthy to survive, he must remember this law, and govern his altruistic efforts, both individual, and organized, accordingly. Fortunately for the race, the efforts making by some misguided charities to reverse this law, are evanescent, and puerile, for nature finally has her way, and the fittest only in the long run survive.

This does not mean, the killing off of the weak. But man, by not interfering with the evident law of Nature, which is a merciful law to the race, will thus place the welfare of mankind where it will be most justly and mercifully dealt with by the most important natural law, of which we have knowledge. The most penetrating minds have discovered this to be the law, viz the survival of the fittest by natural selection. Now this is the evident method whether it is natural or supernatural. No vicarious atonement suffices to avoid it. Natural morality consists in the efficiency of work whose effect is the good of the whole race. I presume there is no personal design in the activity

of a volcano that kills a number of people. But the effect is likely to preserve the process of earth evolution, and this results in preserving the earth as a fit habitation for man.

Volcanism and the increased consumption of coal and coal oil will increase the amount of carbonic acid in the air. This gives a higher temperature and increases the fertility of all life on the surface of the globe. During the glacial epoch volcanic eruptions were rare. But the increase of them brought on the inter-glacial epoch we are now enjoying. In other words, the calamities of the eruptions of Krakatoa and Mont Pelee, so destructive of life in their immediate environment, largely increased the general conditions of life on the globe. The production of vegetation is largely increased by a rise of temperature caused by the existence of carbon dioxides in the atmosphere, in an increasing percentage, produced by the methods above set forth.

The individual efforts of man, the customs of society, and the laws of the state, in designing ways and means for improving civilization, and the general welfare of the race must conform to the natural laws of evolution. The aim should be to eradicate the causes of misery, poverty, disease and general immorality. There is now too much wasted effort upon the effect, while the cause is allowed to remain. Men are pouring money into conventional means of relief, whereas commercialism, militarism, slavery, special privileges, by which the earnings of the worker are absorbed by the few, are left to continually produce the subjects for relief. Make men producers, by just and equal laws, giving them the benefit of their production, then let the

natural law of evolution do the rest This is the highest morality and the truest religion

The gardener takes a few plants and places them in a hothouse. They grow to abnormal proportions, but very tender, as long as the conditions remain, but when the abnormal heat, tender care and over sustentation are withdrawn, they revert to their original natural condition. What we call "our boasted civilization," has very much a parallel process. There is a tendency to produce abnormal conditions by the reversal of the great law of nature, the evident effect of attributing to the supernatural, the unreal, the source of all human happiness and progress. The farther away from physical science, or the teaching of Nature, a moral code departs, the less effective it will be in building up a strong and desirable civilization. The evanescent and feeble human brain must necessarily be the maker, and interpreter, of the moral code attributed to the Unknowable. The human hand writes what he calls the commands of the supernatural. Emanating in theory from the unreal, not from objective reality, such laws cannot be the true basis for building up a real and lasting civilization. The theological codes now in force having been written when all mankind was entirely ignorant of what are now plainly the perceived laws of nature, cannot be, except in part, the true guide to a strong, natural civilization; such as must be the natural code of ethics, the human race must eventually adopt, when a proper foundation is laid in the knowledge of such great natural truths so lately discovered, as the persistence of force, the indestructibility of matter, the unity of nature, and the evolution,—not creation,—of all things. That part of the decalogue, and those rules of conduct,

which the experience of mankind finds in conformity to natural laws, i e., the laws of evolution, will abide

The words "real" and "reality" used in this book must be interpreted, as meaning the experience of the sane individual A real objective thing as used here means the opposite of fiction, or hallucination.

Note to page 254: Buckle, in 'Introduction to Civilization in England' page 1, Vol 2, says "I have endeavored to establish four leading propositions which, according to my views are to be deemed the basis of civilization. They are first, that the progress of mankind depends on the success with which the laws of phenomena are investigated, and on the extent to which a knowledge of those laws is diffused "

The second, third and fourth propositions are mere elaborations of the first

CHAPTER VIII.

Natural Morality.

The title of this chapter may convey to the reader the idea of a fixed, unalterable code of morals, comparable to the decalogue. But natural morality cannot be so formulated. A natural code must necessarily be the logical outcome of the principles set forth in the preceding chapters. It is one entirely disconnected from supernaturalism.

It having been contended, so far, that life in the aggregate is a differentiated form of phenomena, whose evolution has occurred by precisely the same method as all other evolution, the relation that all forms of it bear to each other, as well as to the aggregate, must be governed by the same fundamental natural laws. The phases of this relationship are of such infinite variety, that to undertake to formulate a conscious duty, adapted to each variation, would evidently be impossible; nor would such formal category be useful. An adjustment that must be eventually readjusted to conform to local needs, just as the ideas of man change as the centuries go by, or as the brain power increases, is the only progression that gives increasing strength and more persistence. Therefore, it is better to state the principle that most obviously lies at the bottom of this perpetual readjustment; and then, if that prin-

ciple is correctly stated, it will be the human guide in those conscious situations daily presenting themselves to the individual for solution and adaptation wherever and under whatever conditions he may exist. A general statement of this principle would be, in an all covering sense, that man's natural morality is his normal adjustment to environment human and non-human. "Normal adjustment" here means the relative power of the brain to comprehend phenomena and keep in necessary correspondence with them. It is plain that it will greatly vary throughout the world.

As there is no absolute standard of truth, so there is no absolute standard of morals, because every phenomenon apparent to man is relative, limited at least to time and space, so it is evident that the only code of morals that can be more applicable than any other is that based upon man's relation to phenomena, especially to his fellow men and society. While his relation to, or more properly his correspondence with nature, and its laws, can be comparatively stable and fixed when once such laws are understood, yet his correspondence with his fellow man and society will be more or less modified by the very mobile variations of social customs and laws according to locality, which create that peculiar emotional condition in every individual, called conscience. This can also be called, shame, remorse, or regret, which acts as a stronger control of motor action, than does the ordinary intellect. It is the creation of public opinion in communities. Whatever that public opinion requires is moral for it, whether it is the fighting of a duel, the murdering of a witch, the keeping of plural wives, or the worship of an idol, or a God. These things are immoral in other differently located communities. As Kautsky says,

"Prison, poverty, and death are preferred by people to shame."⁸⁶ Kautsky also quotes some curious letters of a converted Esquimo. For instance, "My countrymen know nothing of either God or Devil and yet they behave respectably, deal kindly and forcibly with each other, tell each other everything, and create their means of subsistence in common." This is a natural morality without supernatural control

Nansen says of the Esquimo life, "One of the most beautiful and marked features in the character of the Esquimo is certainly their honorableness." Honorableness means their morality. But the conception of theology has heretofore confined, and does now confine, the definition of ethics, to a rule of conduct emanating from a personal law giver; and the requirements of it confined to man's relation to that personality and to his fellow man without reference to local conditions. That is a so called supernatural code. It is contended that this fact gives it sanction, and is the criterion of its enforcement

The foregoing pages set forth that such an origin is an unknowable cause, and give the reasons why man cannot have correspondence with an "Unknowable Absolute." It is unnecessary to repeat what is there discussed, in regard to phenomenism,—the cognition by man of that only which comes through his peripheral senses in either of two ways, viz, personally to each individual; or first to his ancestry, and then, indirectly, to him by tradition, or written signs. Therefore, man derives from psychological "experience" only, the facts upon which he must base his code of ethics. These facts are those of phenomena only, and not of intuition, or "spiritual vision," or faith based on hallucination. There are two phases,

of man's correspondence with environment, that should be considered in the treatment of any natural morality. The first is man's relation to the forces of nature, as such. This relationship is purely intellectual, and not being moral, in the current definition of the word moral, I must arbitrarily assume that there is in it a moral element, at least in one aspect. Unless man conceives the truth regarding the material facts of the universe, and its laws, there is no reason why he should not be expected to continue in the belief of the geocentric scheme of theology, which now dominates Christendom. Prior to Copernicus, Newton, and Darwin, the only conception possible to mankind seems to have been the biblical account of creation. From this, the only ethical code conceivable to a people, in this intellectual attitude toward nature, seems to be the one incorporated in that account, that is, the decalogue. It is very likely that modifications of that account dwelt in the brains of preceding lower orders of man, and this fact is more probable since, it is reasonable to suppose, that the biblical account and the Jewish religion were only the formulation of a tradition that has been handed down from a very remote age, prior to biblical times. So that, until man comes into correct relation intellectually with what is termed the physical laws of nature, it is very doubtful whether he could form a natural code to take the place of the supernatural one, by which he is largely governed now. I do not desire to say that every part of the present code is unnatural. Some of it may be called natural, but the whole of it is conceived as of supernatural origin. It is based upon the fear of the unseen, and unknowable. It being a fixed written code, to which are attached certain promised punish-

ments, the consummation of which it is impossible to determine because they are supernatural and conjectural, there is no way by which it can be amended to fit into the growing development of intellect, and intelligence, now apparent in mankind. This modification can only come with the growth of intellect and must be made by man himself. It does not fit into the present intellectual condition of mankind. Hence, the necessity of considering man's relation to inorganic nature, as not altogether intellectual and unmoral. To some extent in every thing a man does, from the unconscious act of breathing, up to the highest thought produced by the molecular motion of the brain tissue, there is a right, or moral, way to do it. The man who breathes correctly is doing more good to his body than he would do by abnormal breathing. The assimilation of food, the walk, the manner of wearing clothes, the expression of the face, the articulation of words, even the selection of the proper words in speech, all have an ethical bearing. If these are well done, it means that they fit into the noiseless correspondence,—the life,—of the organism, and its surroundings; the individual thus preserves his normal correspondence with physical environment, and an attractive, not repelling, attitude to his fellow men. But if they do not harmonize with the environment then they are evil—immoral, and the violator suffers some pain or unhappiness. He is also frowned upon and avoided by his fellows.

The laws of nature, which are also those of evolution, are unchangeable in their method, therefore, man's welfare, his morality consists in adapting himself to these laws and not in calling upon some unknown power to change them for his special benefit.

The man who so controls his functions as to meet all the varying phases of climate, gravitation, sustentation, etc., is not injured but benefited by them. This is because the effort, the exertion he thus makes, develops him into a self-reliant and powerful organism. Figuratively speaking, that is, using the term "Nature" in a personal sense, but disclaiming any intention of believing it to be such, and knowing there is no theology in force or energy, I will say that nature can make no mistake and does absolutely right at all times. Everything it does is not only absolutely right, but it does in every instance that which is for the best and moral welfare of man himself. But this is done without reference theologically to man's welfare. Whoever is in normal attitude toward his environment would not be wishing for rain when it is dry, nor for cold weather when it is hot. He will be perfectly satisfied with whatever comes because he will be in proper correspondence with it and will know he cannot change it. A perfect man, if such an organism were possible, would be in perfect correspondence with all the requirements of natural law; and death to him, which is the cessation of correspondence, would then be postponed to the latest moment compatible with the welfare of the race, and then would be regarded, as it really is, only a change of form. The survival after death of all bodily elements and the perpetuation of the race, constitute an immortality which is natural, and does not require a miracle to make it possible. This is natural, not personal, immortality. The latter means that the "soul," which lives always hereafter, has lived always heretofore. This, however, is only a logical conclusion of scientific non-believers in special creation. But some theologians have repudiated the idea that the "soul"

has always existed, because that negatives the idea of its special creation. To them nothing except God always existed. It is true that death is now regarded as a calamity, although an inevitable natural law. But in the ultimate analysis of it, there will be found this essential definition; it is the closing of the correspondence between the organism and its environment by reason of that organism's violation of some of the essential laws of that correspondence, or from the necessity of race maintenance under the law of the survival of the fittest. On this account the elements of the organism are dissipated and transformed but not lost. But the objective environment remains the same. The idealist, who contends that the existence of the objective depends upon the existence of the organism which embodies the subjective, may deny this. Death therefore when it occurs naturally is not a calamity, nor a thing to be regretted. The attitude of mankind toward this necessary step in evolution is not according to the best reason.

Of course, this definition of death makes it an essential link in the method of evolution. But its occurrence too early in life, if caused, by violation of physical laws, that is preventable, can be avoided by a wise system of education, in physiology and hygiene. Death from old age can perhaps be thus postponed to a later average date, than it now occurs.

In Egypt death in whatever form was considered by the priests as assassination. From their standpoint it was the act of man, an animal, or of a spirit, or of a God. It was not a natural phenomenon. This idea in a modified form is still held by theologians everywhere, it being held that "death is the wages of sin." It was the province of biological science to discover that it is a natural

process with which animism, or magic, or supernaturalism have nothing to do, except in the imagination or superstition of the theologian. It is customary for the priesthood in these days to deride the animism or polytheism of the past as down-right superstition. But as their own ideas of supernaturalism are direct descendants of these with modifications, they might well include their own theology in their derisive comments on the old delusion. Why should not one form of supernaturalism be the subject of derision as well as another? The fact is, that the only safe line to draw is that which will exclude as absurd all forms of supernaturalism and confine human actions and beliefs to the operation of natural cause and effect, as disclosed to the human senses by scientific investigations. Of course, this method will not always, especially at once, give the proper or true interpretation. But it does eventually in most instances, e. g., in Astronomy in the discoveries of Copernicus, but not until the 16th century; in geology, not until Lyell in the 19th century; in biology, not until Darwin in 1859. There is no other method known that has given so much certainty to those essential phenomena with which man's life is so connected and on which he must rely for his very existence. This is especially so in anatomy, chemistry, physiology and medicine, and to me just as essentially so in morals and intellect.

The neglect of society to avail itself of sanitary measures is the highest immorality. Yet the present orthodox code takes no notice of it.

It seems to me then, that the highest code of ethics will be based on this necessity of maintaining a rational correspondence with physical environment, as one phase of its composition. Education should be

I mean by the term "he comes from below and his power is there" that the human organism, as it is now developed, was evolved phylogenetically from an order of lower organism, which, when traced back scientifically terminates at its primitive end in the inorganic. When this line is traced back ontogenetically, it is found to begin as an embryo in the form of mere protoplasm, or animal life of a very low order; that not until evolution had produced a nerve structure does it exhibit the higher phenomena of life called psychic. Its basis therefore is in the physical, and its very power of existence, and therefore, all its mental and moral power depends upon its drawing its life sustenance from the earth, not from the space overhead. Here and there only, e. g., in the writings of Darwin, Spencer and Huxley, in the history of man, has it cropped out that he is at all a natural product. The family, society, and government are crystallized around the conception, that the universe is a personal emanation, and under personal laws, emanating from a personality unknown, but whose variable will is the cause of all phenomena, whether good or ill. This conception necessitated that man should spend the most of his time propitiating this personality, who, according to the theory, had it in his power to send, or withhold, the warmth of the sun, the rain, the storm, health or disease and death. The evolution of civilization in this belief necessarily established a class, who by their recognized natural ability, and assumed knowledge, were believed by the masses to be nearer, and in closer correspondence with, this omnipotent personality than others. This class became the medium, through whom the supposed communication from the controlling personality, to the masses, and from the masses

to him, were necessarily transmitted. This class became the educators, the chiefs, the priests, and the rulers of the people. They taught the people what they considered it best for them to know and that was always, that they must believe in the supernatural personality, and obey what this power communicated through their teachers and rulers.

What a power and temptation this was! What a power it was to keep the masses in ignorance of everything that would upset their belief in this personal government! What a temptation, to communicate to the masses only those things that would continue the medium class in power, and fasten upon the masses those institutions that would tend to make them slaves to the medium class! This medium class became the kings, and priests by "divine right"; by the same right slavery and polygamy were established and maintained.

A moral code was interwoven in the most ingenious manner with the other teachings. But this prescribed moral code never interfered with the prerogatives of rulers and priests. When the moral code said, "Thou shalt not kill," it did not mean that kings could not kill their subjects and slaves; nor that the church should not kill those who disbelieved. When it said, "Thou shalt not bear false witness against thy neighbor," it did not prevent the rulers from misrepresenting to their subjects, and making war by deceit and lying upon neighboring tribes and nations. In other words, the moral code was made for the subjects, and not for the rulers. These teachers of the people kept them in ignorance of everything, except the belief in the supernatural, and obedience to the decalogue.

They were taught those things only that would not interfere with this belief

"How so many absurd rules of conduct, as well as so many absurd religious beliefs, have originated, we do not know; nor how it is that they have become, in all quarters of the world, so deeply impressed on the minds of men; but it is worthy of remark that a belief constantly inculcated during the early years of life, whilst the brain is impressible, appears to acquire almost the nature of an instinct; and the very essence of an instinct is that it is followed independently of reason." Darwin, "The Descent of Man," p 124.

The second phase of a natural code of ethics, is man's relation to his fellow man, as a part of his general environment. In reality, the former relation—that to nature at large—is one rather of adaptation and defense. In that part, the questions generalized into the golden rule, viz.: altruism, justice, mercy, love etc. do not properly arise. The treatment we receive from the laws of nature is only justice, in a very abstract sense, that fact being that all are served alike. But mercy, love, and the beatitudes do not seem to enter into it in the personal sense of those terms, as they do in the relations between mankind. Impersonal cosmic power is not the same in results, or conscious consideration, as is the personal power exerted by men toward each other. It is only in the associations of men, and the relations growing out of these, that a code of natural ethics evolves, which includes those conditions resulting from attributes peculiar to animal life, such as fear, love, anger, and the sexual emotions. This personal code includes the altruistic which is attributable to all animal life having nervous structure.

Of all animals, man is the least able to supply his own wants. Therefore some kind of co-operation with his fellow man became a necessity to primitive man and this has continued to the present time. Only animals with great power of supplying their wants can live in solitude. This weakness in man is the very element, that has worked, and is still working, not only for his higher morality, but also for the most subtle altruism. Both the morality and altruism, are therefore, natural evolutions from the physical nature of man. If sociality is essential to his proper sustentation, and defense against enemies, the increase of the number who stand together for these purposes should increase the tenacity with which they stand together, and thus evolve a natural civilisation. Hence, also, the evolution from this necessity, of love for wife and children, and to a less degree of his fellow men in general; hence the evolution of the gens, the tribe,, the confederation, the state, and the nation; in succession; hence patriotism, and all virtues. The highest evolution from this necessity is the brotherhood of mankind, which will eventually come by the working of the same natural evolution.

If this is a true statement, where comes in the necessity of the conception of the supernatural power which has arisen from ancestor worship, in which the living are governed in a personal manner, and more by the dead, than by the living? The assumed human vicegerent of an unseen personal maker of a code can change the written decalogue. He wrote it in the first instance; but the unwritten laws of nature never change; and no human hand can write them other than they are, and always have been.

This natural kind of human ethics is not confined to

the human being. All the lower animals exhibit it in certain degrees. It pervades all nature and is just and impartial.

The evolutionist views man, in his primitive stage, as little above the animal, governed by passions, desires, and instincts, inherited from his remote ancestors. His altruistic evolution comes from his association with his fellows for the purpose of mutual protection, and is correlated with the economic, political, and intellectual evolution of society. "An animal impulse, and nothing else is the moral law. * * * Certainly a mysterious impulse, but not more mysterious than sexual love, the maternal love, the instinct of self-preservation, the being of the organism itself, and so many other things, which only belong to the world of phenomena, and which no one looks on as products of a supersensuous world." I should add, that it is evolved biologically from the very nature of the necessary prerequisites of life itself, from the most primitive form of life; not only this, but from the atom of the nebula, whose principle was "condensation." This is the criterion of its binding force, its strength. But the theological conception is that man himself was specially created perfect, with a conscience perfect in its power to discriminate between right and wrong. But, as it is historically true, that man was not perfect in historical time, for history as well as tradition shows that he ever was "prone to err as the sparks to fly upward," then it becomes necessary in vindication of the above theological conception to create, in the mind, another supernatural power,—a personal devil,—and give man a so-called free will, under the control of said devil. The alleged perfection of Adam's creation did not prevent his

going wrong at almost the first opportunity, and man has been doing the same thing ever since.

Our present Christian civilization is crystallized around this theological conception. Now suppose that the evolutionist's view, and not that of supernaturalism, had been the one adopted in the first instance; what kind of a civilization would have resulted? Suppose, also, that as man advances in knowledge, and therefore in intellect, and he rejects this supernatural conception of the origin of morals; and adopts that of natural evolution; at the same time, will the resulting civilization be less desirable?

I am sure I can anticipate the answer of every one who has at all investigated the subject, that it will not be.

"I have lived with communities of savages in South America, and in the East, who have no laws, or law-courts, but the public opinion of the village freely expressed. Each man scrupulously respects the rights of his fellow, and any infraction of those rights rarely, or never takes place. In such a community all are nearly equal. There are none of those wide distinctions of education and ignorance, wealth and poverty, master and servant, which are the product of our civilization. There is none of that widespread division of labor, which, while it increases wealth, produces also conflicting interests. There is not that severe competition and struggle for existence, or for wealth which the dense population of civilized countries inevitably creates. All incitement to great crimes are thus wanting, and petty ones are suppressed partly by the influence of public opinion, but chiefly by that natural sense of justice, and his neighbor's right which seem to be in some degree inherent in every race of

men.”* Is not this a fine negative statement of some of the evils developed in Christian civilization?

As morality is the bond of civilization, it is important that it be based in the broad truths of all nature. All men properly organized are desirous of promoting the growth of what is generally called “righteousness.” That word, however, is quite indefinite in its application. In some localities, and under certain conditions it is considered quite compatible with a state of external war; and in others, with a state of what we would call decided immorality.” I should call righteousness that state of social, and individual relationship, in which, the material welfare of each and all is best promoted. It means, that the right thing shall be done, at the right time, to the right person, and in the right way. All these terms are relative. It would be a state of rightness that cannot exist in a monarchy, nor in slavery, nor where the laws are unjust, and unequal, though under such conditions some individuals may be called righteous. But the organized upholders of the theological code in the localities where monarchy and slavery exist, have always been the defenders of these institutions. Yet unless the people themselves are free, unless they are their own rulers, and law makers, there must be unrighteousness as a whole. It is the same if they are dominated by a hierarchy called spiritual. For the latter means intolerance of all freedom both of opinion and action. In short, the ideal state of righteousness is, in a broad sense, freedom governed by only self-imposed law, such as theoretically exists in a republic, or democracy.

My opinion is that if the idea of the necessity of

* “Malay Archipelago” by Alfred Russell Wallace.

the objective existence of the supernatural had not existed in the human mind, all the fundamental truths discovered by science, and now so unconsciously taken as true by every one, viz, the Copernican system, attraction of gravitation, Kepler's laws, the nebular theory, evolution, the unity of nature, the indestructibility of matter, and the conservation of energy, would have had no opposition worth mentioning, and practically been adopted at the time of their announcement. So also the religious persecutions, both Pagan and Christian, would not now redden the pages of history with the blood of so-called unbelievers, all through historical time.

Does any sane man of intellect believe that civilization would not have been greatly benefited by the omission of such opposition to science, and of the persecution of men because of unbelief?

"Civilization is simply the process of an adjustment on a large scale whereby man's whole nature, physical, intellectual, and moral, develops in all its marvelous complexity in response to an environment, also increasing in complexity." But this adjustment must be made by the natural law of evolution before it can become enduring.

Mark the order of the adjustments as stated,—First, physical; second, intellectual; third, moral. This is the natural order of evolution in general. The first development of an organism, from undifferentiated protoplasm, is into the purely physical cell,—the amoeba, for instance, consisting of one cell, and all stomach—no nervous structure. It is not until the organism has attained considerable complexity that nerve structure is evolved; then intelligence begins to dawn. But it is not until it becomes so complex in

correspondence with a like complexity of environment, that it requires what are called memory, reason, and will, that the intellectual is evolved. Lastly, the moral, or ethical, is evolved from the intellect, or develops co-ordinately with it. It is the same way in the evolution of society from the primal gens, leading a purely natural life, to the present complex civilization, governed by the code supposed to be given by the supernatural in the patriarchal days. The present prescribed code of morality is not the "root but the fruit of civilization." But a natural code founded on the laws of evolution would be the root of a much higher, and more enduring, civilization than the present one. It has been the real root of what is strong, and enduring, in the present rapidly changing civilization. The reasons of this, in addition to those already stated, may be given as follows. Since the natural code is founded on the necessity for the adaptation of man to his environment, the complexity of it depends on the complexity of his nerve structure, which gives him greater and greater conception of the relationship, just in proportion to the development of his nervous system. In other words, the more complex the intellect, the more numerous and profound the objective truths revealed to it. It follows that these higher adaptations, and correspondences, are the various aspects of that persistence of force, which, working through what intellect man has, produces more numerous, and stronger, variations in individuals and society; and these being perpetuated by the principle of natural selection, a corresponding civilization would be produced thereby. It does not require me to compare such a system of morality with the present code to have others see how far superior,

as a positive promoter of higher civilization, it would be.

New England is a fine example of the evolution of the ideas of the people from the supernatural toward the natural, parallel with their growth in knowledge of natural science, and their consequent correspondence with a more complex environment. From the time of the landing from the Mayflower, the Puritans, while far in advance of the religionists of old England, and especially those of Spain and Italy, in the higher quality of their religion, nevertheless were dominated by the most fanatic supernaturalism, even to the extent of witchcraft, and persecution of dissenters. Now, perhaps, Boston presents the example of the most advanced tolerance of religious opinion in the world. Any itinerant can preach any doctrine on Boston Common that is within the pale of decency, and good order. No one thinks of tabooing another for any difference of opinion upon religious questions. So the United States, the freest of political countries in which the general education of the masses, in natural science, is far advanced, and growing, is at the same time the most tolerant of independent belief. It is the finest example of co-development of a high civilization, and the departure from the human mind of supernaturalism. Herbert Spencer's works had their first success in this country, and are now sold more largely here than in England.

It has been clearly shown in history that industrialism, freed from all kinds of slavery, in which every one is allowed to enjoy the fruits of his own labor and think as he pleases, is at the foundation of all social progress. In the primitive age of man, war, not industry, was the means of accumulation, and

industry was the pursuit of slaves alone. Not until labor became free and respectable, and other education, than mysticism and theology, was introduced, did society begin to evolve along the line of better civilization. It was the working of the principle of natural selection that determined the best method of advancement. The best method survived, and the unfit died. Along with economic freedom came what was called spiritual freedom, or intellectual freedom to think as one pleased upon all subjects. So that freedom being once established in any one of the organic functions, by the principle of equilibration, all other functions eventually become free.

Now, the monastic, and ascetic, ideals of supernaturalism in the middle ages were utterly incompatible with a free industrial and commercial spirit. So that it was no accident that the reformation of Luther, as well as political freedom, made most progress in the free towns of feudal Europe at that time. It was the natural evolution from supernaturalism, co-existent with that of free industrialism.

It thus results from the logic of facts as stated, that while emancipation from supernaturalism is not the first impelling cause of civilization, yet, that industrialism, political freedom, and naturalism, as opposed to supernaturalism, go hand in hand in the progress toward a higher civilization; and that our own country, as presenting, perhaps, the highest example the world has yet produced, is at the same time the freest from the old superstitions, and the farthest on the road toward the freest naturalism. This proves that not only is belief in supernaturalism not essential to a desirable civilization, but that a really desirable civilization cannot be evolved without at the same time

slowly eliminating such belief from the human mind.

Another proof that supernaturalism is not essential to civilization is that the idea in the minds of men of its form and attributes does not remain constant in the different stages of the evolution of civilization, although the idea of its objective reality does remain constant. The God of the middle ages was a God of war, slavery, and polygamy. The God of Jesus, as conceived now in the United States, is one of peace, love and fatherhood, until there arises what a president may consider a necessity for war, and then the God is changed to one of war, and the pulpit becomes the advocate of it. So the character of the God has always been changed to correspond with the varying desires of the people from time to time. The Mormon God is that of the middle ages, and commends polygamy. This shows that the idea of the nature of God is an evolution from the civilization, and not the creator of it.

The God of early Israel was a very different god from that of the prophets. The latter God was not the author of evil. A devil was created to take that stigma from Yahveh, who had now developed from a tribal god who made a covenant with Abraham, into the good, all-wise, loving God. In this can be traced the influence of Zoroastrian ideas. In Jeremiah 23, "Do I not fill heaven and earth"? and this is the evolved idea from the old idea Yahveh, the tribal god whom Moses argued out of the notion of destroying the children of Israel by reminding him that the Egyptians would hear of it and rejoice.

Says Macpherson, "Science will increase, rather than diminish, the feelings of wonder, awe and humility, which are the real roots of religious feeling, and

so long as this is the case, man need not fear that, with the decay of theology, a blight will fall upon the earth."

The ideas of the supernatural when evolved in the minds of men appeared in the following order:

First, external forces took the form of a personal will, like our own, residing in each object. This is animism.

Second, it took the form of several personal wills controlling each phenomenon, in the different departments of nature,—polytheism.

Third, the form of one personal will controlling the phenomena of the whole cosmos,—the Hebrew God

Fourth, now, in the process of reconciliation of science and theology, it is proposed, by such scientists as Le Conte, to still further remove the personality beyond the realm of natural laws, and make him the entity, or reality beyond appearances, as the starter, or creator of the natural laws, but leaving those laws to work out by natural evolution their natural results without his further interference. These are modified subjective ideas, in the brain of man, of the form and power of the supernatural. There has been no change in belief in the fact of its objective existence in some form from the day of our cave ancestors, among all believers in the theological idea. Just as biological evolution always preserves some structure of existing organisms; in the sense that there remains something of the characteristics of previous forms in the derived forms, so in the evolution of religion, the present form of it must necessarily retain many of the characteristics of the lower forms of animism, magic, polytheism, and ancestor worship out of which the idea has grown. The idea of the supernatural

now prevalent and the prayers and propitiations offered by the devotees of the present day are survivals of the most primitive savage methods. The local gods of the latter were supposed to grant the desires of the worshiper in answer to prayer or threats; or they would be driven out and superseded by other gods who would be more considerate. The present idea of a God is not so subject to such frequent changes; but he is an evolution in the brains of his worshipers from a local Jewish god. He did not always hold this exalted subjective position. In the evolution it was a continuous change toward an abstract idea, which has not yet ceased to evolve. This is monism, a much wider idea than monotheism. It means that the universe is a unit, and that its laws, its substance, its function, its structure, the shapes and motions of its bodies, the infinite variety of its manifestations, or phenomena, could not be what they are without that inter-relation of every particle of matter and motion with the whole, and that if it were possible to extract, annihilate, isolate the earth, or any other body from this inter-relation, the whole would be reformed and readjusted. It is beyond the power of any supposed omnipotent ruler to prevent this, however monotheistic he may be, or notwithstanding any potent attributes that man may ascribe to such an imaginary being. Therefore, monism in reality includes within its meaning any power, whether it may be personified by theology into monotheism as a single omnipotent creator and ruler of the universe, or merely abstract energy, because it does and must work in uniformity with the known natural laws, and not independent of them. It may be answered that the creator chooses thus to work.

That is simply another way of saying that there is no evidence of his having done anything contrary to the law of evolution. He should then be included in the term monism and the other term, monotheism, dropped. This idea makes him an evolution from, not independent of, the material universe. In reality, the real history of religion shows in its primitive stage a conception of the divine at first lower and for long ages, at least, no higher than man himself. From this there has slowly evolved in the brain of man an idealized spiritual being, which is an embodiment of the highest perfection and a maker and ruler of the universe. Now this is the evolution of an idea, not of an objective reality. For the latter would mean that the present divine actually grew like the human being from a very low form of a god to his present stature as the maker and ruler of all things. But the theological conception of him is that he was the same from all eternity. Whatever he may be in reality, the fact is, the conception of him in the brain, which is the only thing about it that is real to us, has been an evolution, just as everything else has been. With regard to the changes in the idea of a god that have occurred from time to time in the past, it seems very wonderful that such idea has not changed much more rapidly since science began to make such radical changes in our former conceptions of natural law. It is to be presumed, regarding the accounts given in Genesis of the creation, and throughout the Old Testament, of the presence, and interference, of the supernatural in natural and human affairs; in the New Testament of the suspension of natural laws, in the occurrence of so-called miracles, that in the absence of any knowledge of science in

those days, the record thus given in the Bible is that of occurrences that seemed to the human writers of the accounts to be true. In the making of this statement, is given the justification of the sincerity of the writers of the Bible, that they were, according to their intelligence, in the actual pursuit of truth. In other words, if they had been in possession of discoveries of present scientific investigations in astronomy, geography, physics, biology, anatomy, geology, physiology and chemistry, they would have written a very different conception of a God, and given to the world a religion founded on the facts of natural cause and effect. These sciences have disclosed the untruthfulness of the account of creation; the improbability that the creator made such a bargain with Abraham as stated; or that he carved on tables of stone the Decalogue and delivered them to Moses; that any miracle ever occurred; that the earth could stop an instant in its diurnal revolution to favor Joshua in a battle; that a man could be born of a woman by immaculate conception; or ascend bodily from the earth into space; or walk on the water, and turn water into wine. If, however, we credit the writers of this mass of misinformation with intellectual sincerity, what shall we say of their present day followers, who have before them the indisputable refutation of such a God and such a Bible in the sciences above mentioned? Because there is woven in with the mass of error a plausible ethic, which can be preserved entire after the errors are eliminated, and because there has been crystallized around both the error and the ethic an organized church whose influence is too dangerous to give it state support, they yet pretend that it would be injurious to the welfare of society

to conform this system, called religion, to the facts as now firmly established and thus change an effete and untrue creed to an adapted and scientific religion. I contend that the true orthodox is the one who strives for the scientific conception of righteousness, and that he who is trying to retain the old idea of the Hebrew Yahveh in the world is the unorthodox, and the atheist. Note how gradually in the order of the evolution of the idea above given the conception has changed, but always toward a final elimination.

The fact that when the so-called Pagans of Rome were in power, they persecuted, and killed the Christians; and when the Christians rose to power they did the same to those who did not believe as they did; proves to my mind that the belief in the supernatural is accountable for the persecution of each side. Had beliefs in a natural code been prevalent, there could hardly have been this peculiar species of killing. The early Christians in Rome were called atheists, not only because they denied the pagan gods, but because they equally were indifferent to the old Jewish god and the Jewish religion. As the Roman said, they had adopted as a god a dead man named Jesus. The pagan expressed a contempt and horror of a dead god. When the Roman Christian church rose to power, and built the vatican, more imperial than the royal temples of ancient Rome, on the site, as Gibbon says, of the circus where Nero cruelly murdered so many early Christians, then the church of Rome could afford to express greater contempt for the pagan gods, Hercules, Venus, etc., than did Nero and his people for Jehovah and Christ. But in those days there was little scientific conception of nature and its laws. So all sects and beliefs attrib-

uted natural effects to supernatural gods, and then made war on each other in succession to determine which gods were the real causes. If either god possessed a tithe of the power attributed to him, he certainly would have prevented so much slaughter and sacrifice, and set the people to applying their energies in building a civilization in which wars and killing would not occur. Tolerance of opinion has arisen, only as this idea of the supernatural became modified, but will not become perfect, until the whole idea fades from the mind. There is no prophesying how long it will be before the human brain will become entirely free.

If evolution is true, then in the light of the unity of the evolution of natural phenomena, it applies its great method of development, natural selection or the survival of the fittest, to every change from that of an amoeba to man, including the change of man's condition from a solitary roamer of the forest to his social status as the citizen of a great community. It applies equally to the changes, now going on in man's religious psychology.

All social evolution depends, of course, on the combining of men in social communities; that is, men acting upon each other in a social capacity. The intellectual and moral character of a community is the aggregate of the individuals composing it. Whatever is done thus is done, of course, by the action of the individual members. The savagery, barbarism, or civilization characterizing it, is said to be created by the reason of the aggregate men composing it. But if this reason is the result of biological evolution in the individual, and is limited by the neural and anatomical structure of the members of the com-

munity, in correlation with the natural forces in the environment, then all the effects, or results, of that reason are really evolved from these physical correlations. In other words, all social conditions throughout the world are evolved through the brains of men by natural forces, whose requirements cannot be ignored by any assumed independent action on the part of men. In this view, which seems to be the correct one, man really exercises no "free will" in social, the same as he does not in individual affairs. Every effort and every function is bounded by the limitation of the human brain.

The fact is well known that ever since the beginning of historical time, society has been advancing in the forms and essentials of its civilization, only as it discarded superstition and delusion, and adopted the truths of natural science. Not in a direct line, but as all progress is made, rhythmically, in periodical ups and downs. Today, the conditions are almost infinitely better than they were in the dark ages, when the densest superstitions ruled men and the church was in the full control of men's ideas, and very much better than two hundred years ago, when witchcraft and slavery were quite universal, and when the death penalty attached to a large number of simple misdemeanors, and debtors were imprisoned in filthy dens.

Hobhouse says that in England death was theoretically the penalty for all felonies except petty larceny and mayhem from the middle ages down to 1826. Also that serfdom was finally abolished in France without compensation on the night of August 4th, 1789, along with the other incidents of the feudal tenure. At the same time fell the whole system of

privileges which had made the nobles and the clergy castes set apart from the mass of the people. The idea of the supernatural in men's minds correspondingly faded away.

I think the facts will show that as civilization has advanced, at the same time many superstitions have passed away, all religious ideas have become correspondingly modified, the gross anthropomorphic and materialistic conception of a God, that once obtained, has constantly advanced toward the abstract, and has become less and less personal. Even in the last fifty years, there has been a great change in the discourses of theologians.

As to the religious habits and mental conditions under the old theological conception, I will quote from Professor N. S. Shaler's "Individual," pp. 206-207:

"Those who have been so fortunate as to have been reared in a true Christian faith can have no sufficient idea of the torture to which the minds of men were subjected by the old-fashioned discourses on the punishments that after death assail all save the few chosen ones. The human fancy has ranged far, but nowhere else has it gathered such a harvest as in the sulphurous realms. Cruelty is a natural motive in man; it came with the vast store of good and bad that was sent" (he should have written "came" not "was sent") "to us from the lower stages of life. All the better influences of society worked against it. The teachings of Christ should have banished it from the earth, but for nearly two thousand years these teachings have been made in appearance to justify the endless picturings of torments upon the immortal bodies of those he sought to save. I recall the preachings of a worthy man, famous in my boyhood as a great exhorter. I see and hear him even now, after

nearly half a century, rolling out his story of the torments of the doomed, with a drone of sorrow in his voice, but with an evident relish of the cruelty that he painted amazingly well. Men and women fell down with fear and horror before the terror he forced upon them, the terror of what death may open to man.

"For centuries a host of able men have been at work perpetuating these brutal ideas throughout the civilized world. Can we wonder that, with this endless dwelling on the ancient conceptions of the brute in primitive man, cruelty and fear which Christianity should have cleared away still cling to man? That the altruistic motives which naturally lead them to put aside all personal considerations of their fate should still have so small a part in their actions?"

"One of the best things that can be said of the century (the nineteenth) that is drawing to its close is that it has seen the end, or at least the promise of the end, of the ancient demon-worship. The physical hell, the personal devil, his imps of all degrees, the fiery furnaces, and all the other agents of torment are passing away from the imagination of man. There is probably not an educated clergyman who believes in them. There is scarcely an intelligent congregation where the preaching that was demanded fifty years ago would be tolerated today. The idea of suffering for evil done is firmly rooted in the minds of all men of sound moral nature; suffering in this or any other world until it has accomplished its fit work; but the old conception is now being purged from our religion, which it has so long disgraced."

It is a wide stretch, from the conception of a literal hell, and a material heaven; from special creation; the constant cessation of natural law in order that miracles might occur; the killing of men for opinion's sake; from the inquisition, and the holy wars, to the present day conception of natural evolu-

tion, the reign of cosmical law, that never changes; tolerance of opinion, the freedom of religious views, and the evident tendency of all countries toward peace, and good will. Is there any one who wishes to reverse this advance from supernaturalism, and return to the civilization of the middle ages? The theologian may say that supernaturalism still is quite universal, but in reality he is glad that his own church did not succeed, in what it has always tried to do,—to block the advancement of scientific thought and discovery.

This natural generalization of morality, viz, man's natural and normal adjustment to his environment, is applicable to every condition and to every spot on the globe. It is a universal method of religion. There will, of course, be a certain local peculiarity in the environment of every people and in the greater or lesser development of intellect that will make the natural morality of individual correspondence with such environment different from that of other localities. But, men everywhere of equal development of intellect and acquirements of scientific knowledge will as a class be equally naturally moral. The principle of conformity to natural law as the true basis of ethics is not affected by these local phases. It is really the Golden Rule, "Do unto others as you would have others do to you." Man's normal adjustment to his fellow man as part of his environment could mean nothing else. The Biblical code is specialized for the Israelites and, therefore, is not applicable to Buddhists. It is just as moral for the latter to worship Buddha as it is for the Jews to worship Jahveh. But the Golden Rule is moral to both, because it is a general principle that governs people everywhere. Who-

ever conforms to the laws and customs of his tribe or locality is in normal adjustment to his environment and is moral. His conscience has evolved in that mode and regulates his morality because it is a creation of the locality. Some Mohammedan tribes consider smoking as one of the worst of offenses, a sin in comparison with which murder and adultery are trivial. An Arab chief is unable to see how a man can be contented with one wife. Livingston relates that women in a certain locality in Africa were quite shocked to hear that in England a man had only one wife. But were they less moral for this belief?" The following quotation from Louis B. Boudin's "The Theoretical System of Karl Marx" shows admirably the peculiar mobility of the moral idea and how adaptable it is to any use mankind cares to make of it: "Man possesses the peculiarity of placing absolute standards on relative matters, and he calls moral everything that accelerates his progress on any road which he may be traveling, and immoral everything which retards that progress. When he finds, therefore, that any given arrangement is in his way he declares it to be immoral and fights it with all the forces of his 'moral nature.'" Therefore, all men cannot strictly live up to the requirements of the present code, as shown further on in the almost universal violation of the sixth commandment. If he does violate some unimportant requirements of the natural code he will suffer only in proportion to their importance. For instance, should he imprudently expose his person to a draught he takes cold. If he eat indigestible food, or drink intoxicants, his digestion is upset. If he violate any social law, or legal enactment, he suffers accordingly. But the present super-

natural creeds send him to torments hereafter, for any violation of their tenets, and especially for unbelief, which Nature does not include in her catalogue of sins.

I have said that a natural code of ethics is applicable to every place and is therefore universal. I mean that the correspondence of the organism with its environment, so as to conserve its welfare,—its preservation and its perpetuation,—is the same in principle in one place as it is in another. This correspondence includes, of course, his fellow man, the peculiar form of society under which he lives, and the laws and customs of that society. These vary with the locality and the state of evolution of the society and the individual, but the principle is everywhere the same and always natural. Therefore this principle is a universal religion. A fixed categorical imperative, a prescribed written code, made to fit the *a priori* ideas of one social unit in one locality, cannot become the guide of men in all communities, everywhere and under all conditions, not even by the most elaborate and expensive missionary establishment. Men may nominally be converted to such beliefs and approve such a code, but they are habitually violating it. Nor can reason determine beforehand the morality of a future action, because it cannot anticipate all the possible conditions of the entire environment to which it may be necessary for man to readjust himself in all his heterogeneous relations. Man's moral relations to his fellows in times of peace and good will are altogether different from what they are in a state of war towards his warlike enemies. His attitude towards his friends is necessarily different from his attitude toward one who wishes to murder or rob

him, and both may be moral. The divine prohibition of pork as a diet in Palestine may have been correct, because of its supposed injurious effects there, but not in Europe, where it does not cause leprosy. But the murder of a woman of another tribe by the husband, whose polygamous wife died of disease, because such is the prescribed rule of the tribe in obedience to divine command, a pure superstition, is not immoral in that tribe, but abstractly should be immoral in every spot on earth because it is not necessary for any good reason. It will become immoral in that tribe when the superstition passes away. But if one murders another in defense of his own life, that is not immoral anywhere.

Nature is now enforcing this natural morality without the least regard for any artificial code, and the punishment for all violation is being meted out daily before our eyes. But we refuse to see that this punishment is for lapses in immorality, that term being applied exclusively to acts which meet the approbation or reprobation of another; and seldom if ever to lapses of natural laws, or human laws founded on the laws of Nature. The written code of ethics being in some of its parts so impossible to obey, the attention of man is entirely taken up in efforts to obey it, to the exclusion of what Nature teaches every day to be immoral. It may be, that the light punishment that Nature administers for offenses, that the theological code proscribes as unpardonable, makes men feel indifferent to her merciful code. Unbelief for which Nature has no punishment, is to the Council of Trent an unpardonable sin. But could men be aroused to see that sudden, or premature death, or exclusion from society, for social violations, are really avoid-

able by living up to a natural code of ethics, I think it would soon come to man also, that the proper education, is that which teaches how the most health and happiness can be gotten out of this life, by a study of man, and his relation to his complete environment. If men build cities near a threatening volcano, or on a level with tide water, and get overwhelmed, or destroyed, that is a punishment that Nature metes out for ignorance and stupidity, not from design; but because the great law of Nature is the survival of the fittest, which in this case would be those who avoid the destructive forces of life, in the shape of fire and flood. That is, nature violates the sixth commandment, "Thou shalt not kill," which man seems to find impossible to obey. It is curious that, according to the account, God gave the tables to Moses on which he had written this commandment, and then as soon as the "Children of Israel" arrived in Canaan, it is alleged that he commanded them to violate it, by slaying the surrounding tribes. The law has been violated ever since.

God commanded the Israelites to utterly destroy the Canaanite cities—"Thou shalt save alive nothing that breatheth." The Koran commanded a more merciful warfare with believers than with unbelievers. The latter were to be all beheaded. "When, after prayers asking for Divine guidance, nearly all the bishops approved an unwarranted invasion, like that of Afghanistan, the incident passes without any expression of surprise; while, conversely, when the bishop of Durham takes the chair at a peace meeting, his act is commented upon as remarkable. When, at a diocesan conference, a peer (Lord Cranbrook), opposing international arbitration, says he is 'not quite

sure that a state of peace might not be a more dangerous thing, for a nation, than war,' the assembled priests, of the religion of love, make no protest; nor does any general reprobation, clerical, or lay, arise when a ruler of the church, Dr. Morehouse, advocating a physical and moral discipline, fitting the English for war, expresses the wish, 'to make them so they would, in fact, like the fox when fastened by the dogs, die biting,' and says that, 'there were moral qualities, to be encouraged, and increased, among our people; and he believed that nothing could suffice for this, but the grace of God operating in their hearts.' How completely in harmony with the popular feeling, in a land covered with Christian churches, and chapels, is this exhortation of the bishop of Manchester, we see, in such facts as, that the people eagerly read accounts of football matches, in which there is an average of a death per week; that they rush in crowds, to buy newspapers, which give detailed reports of a brutal prize fight; but which pass over in a few lines, the proceedings of a peace congress; and that, they are lavish patrons of illustrated papers, half the wood cuts, in which, have for their subjects the destruction of life, or the agencies for its destruction" "Principles of Ethics," by Herbert Spencer, Vol. I, pages 316 and 317.

In fact, the believers in the supernatural code of Moses by the common human law they themselves have enacted for governing the people of their own countries, have admitted that such a commandment, "Thou shalt not kill," is too general in its nature and that true morality consists in man's normal adjustment to the conditions of his environment. They enact by law that killing under certain circumstances

is moral. Some of the other commandments would have been the laws of every well regulated society, if supernaturalism had never existed, simply as a matter of self-preservation. We must conclude that the present imperfect form of civilization would not be injured, but greatly improved, by the fading away of the idea of supernaturalism, that is, by a slow change of that belief. For only can the change come by the gradual processes of other evolution,—only as fast as other logical ideas are evolved to take the place of those fading away; and that could the average intellect of man have conceived a natural scientific line of conduct and never adopted the supernatural one, the state of society now would be far in advance of what it is; and probably would become far superior to what it is ever likely to be.

I endeavor to outline a universal principle, which being applied in every spot and under any and all circumstances, will produce automatically that condition in man which is called ethics or morality. That principle is, the adjustment of the psycho-physical organism to its environment, according to its enlightenment. This adjustment will be different in different communities and in different places. For the scientist, whose knowledge of the laws of nature is greater than that of the native Australian, or the North American Indian, it should be more completely ethical and moral. But the latter's adjustment being better adapted to him, than could be that of the scientist, it gives him a better morality for his welfare, his preservation, his happiness, than would be that of the scientist, if such a thing could happen as that the higher adjustment of the scientist could by any means be taken over by the Australian, without his intellect

being made equal to that of the scientist. In other words, there would remain the same differences in the ethics of the peoples of the world, then as now, unless all should become greatly enlightened in the scientific truths of natural law.

One category of natural ethics, therefore, cannot prevail until all men equally perceive the same necessity for the application of the principle. The theologian is trying to teach the people a different principle of ethics, viz., the equal adjustment of the people of the whole earth to a law-giver, a personality who gives a written code of universal application without regard to the difference of intellect. That is the warfare between science and theology, the end of which is far off, but not doubtful.

The principle of ethics, being the adjustment of the individual with his environment, is that of evolution, and it follows in natural order the biological evolution of the organism. True ethics is an evolution, and its elements are accounted for thus naturally and logically. But when an author in accounting for morality says it is within us and its roots can be sought in the obvious motive forces of human action, he can be asked whence came these motive forces? The theologian readily accounts for them by saying they were implanted there by a Creator. In this way he accounts for everything. But this does not satisfy philosophy, nor science. The evolutionist meets the inquiry in a natural way by saying they were biologically evolved with experience as part of life itself, and are a part of the constant readjustment of the psycho-physical organism to a constantly changing environment. That part of the adjustment pertaining to the inter-relation of life forms and their

aggregations into societies, is called morality. But there can be no hard and fast line drawn between the latter and all other adjustments that the individual is compelled to make to his general environment.

The nearer society comes to perceiving the truth everywhere apparent to high intellects, the greater the number of functions it develops; and, therefore, the higher will become the civilization. I conceive, that civilization is high, where individual opportunity for growth in intellect, altruism, and longevity are great, and that this individualism is at the same time subordinated, in the proper degree, to the welfare of the aggregate.

When man shall obtain the right of freedom, the right to enjoy the fruits of his own labor, without the fear of exploitations, then happiness naturally follows. All he can ask of the state is, that it will protect him in his natural rights, in return for what he contributes to the welfare of the state.

Paine in his "Rights of Man" says, "The more perfect civilization is, the less occasion has it for government; because the more does it regulate its own affairs, and govern itself." He means by this that the more the intellect is developed, the less is man inclined to encroach on the liberty of his fellow man. Thus intelligence, and altruism, are evolved simultaneously. As soon as man becomes intelligent enough to perceive that interference with the rights of his fellows jeopardizes his own rights, then he needs much less than ever before, any governing power to compel him to keep his hands off the person or property of another.

In our own country, where our organic law is in theory based on the equality of all men, the inherited

taint of this theological division of the people into classes,—one the ruling class, and another the ruled,—still lingers in the habits of the people, and in many of the iniquitous laws that are kept upon the statutes. A natural code of ethics will bear equally upon all men, and not require one to “bend the pregnant hinges of the knee, that thrift may follow fawning”; nor will it make of an elected executive a ruler, but a servant of the people. Oppression, in the form of legal enactment, can have no place in a natural code, nor, under it, could a class of citizens who have the mental power obtain possession of government, for the purpose of depriving another class of the benefits of its own production. Under such a code, human laws must follow the laws of nature, in bearing equally and equitably upon all.

Evolution is a natural law, not a supernatural personal supervision. Whatever method, either in the physical, or in the psychical world, falls within the principle of evolution, is natural law. Those functions of matter and motion which are essential in the integration of forms, or in the dissolution of them, no less than in the formation and growth of social units, such as tribes, states, and nations, are natural laws. It is so, also, with those functions of the members of such social units in making the rules, customs and laws necessary to preserve the integrity and growth of them. These must conform to the natural laws always governing the evolution of such bodies, or they will not produce the objects of such organizations. The law of contract is a natural law, for without the fulfillment of contracts, no society would long survive. The laws for the protection of person and property are natural for the

same reason. Without these society could not exist. This is why I say that human law must conform to natural laws. The natural under the principle of evolution is that which produces only the essential things in the preservation of the cosmic process, and strong, enduring aggregations of mankind are among these essential things. A civilization, adapted to the intellectual development of the members of it, is evidently that form of society which will give the greatest strength to the aggregate, and the most happiness to the individuals. Every custom, rule, regulation, or law that will work toward such a civilization is a natural law, while every one that retards, or opposes the coming of such a civilization is unnatural. In the physical world the laws of the indestructibility of matter, the conservation of energy, of condensation, of the attraction of gravitation, evidently are essential to the integrity of the universe. Should there be any power which could and would change one of these laws, the effect would be disastrous to the whole. It is the same in human affairs. Those laws which work for harmony and what is called righteousness are natural sociological laws, and those that work for dissolution or inharmony are unnatural. It is evident that those laws that receive the assent of the greatest number of the units of a society are the ones which will hold such society together and will produce the greatest strength. Slavery, oppression, witchcraft, magic, sorcery, are entirely human, there are no such things in nature. Should human institutions cease these delusions would cease with them. The farther from natural law society departs, the more deluded it is, the more fragile and less permanent. Human law gives one man special privilege

over another, but natural law leaves evolution to act only by general, not special methods. There is no repeal, nor amendment to natural law, because no error has been made in the first instance. Theology is a history of error and amendment, of trial, failure and renewed effort of the supernatural. But science discloses that evolution has been continuous under the same law always; that matter is indestructible, force is persistent, the same effect always follows the same cause, that no natural law has ever been suspended for an instant to correct any error, or to favor man, or any organism, or to relieve him from his necessary response to an unchanging environment. Could there be a more conclusive refutation of the claims of theology than its failure to connect the acts of its changeable ruler of the universe with the unchangeable laws of the universe? These changes consist of the drowning in the flood of his human creations as failures, and starting again with Noah and his family; only to again redeem them with his only begotten son; and still there is now left a myriad of failures who will suffer eternal torments. If he is the creator of the latter, how could he be the real author of the former except in the imagination of those who wrote the Bible while entirely ignorant of geology, astronomy, biology and all the other natural sciences. It is certain that whatever may be the nature of an "ultimate cause," it cannot be the personality described by the creeds of theology, which attribute to him such inconsistency as to be the author of unchangeable laws for the inorganic universe and such changeable ones for the organic. Since science has made plain such an impossible inconsistency, it is now the era of reconciliation of irreconcilable theories. It

is the plain duty of theology to obtain another revelation, or at least to make a more plausible guess. I say this not in the spirit of levity, but in humility and shame for the weakness of the human brain in its readiness to adopt tradition instead of reason, as its guide in so important a matter. It would seem plain to any ordinary thinker that whatever supernatural theory of religion man may adopt it must be only a guess, for it cannot be based on empirical knowledge. The facts are beyond the reach of our senses. These are the reasons why the rule for our guidance in this life should be based on our knowledge of phenomena. "Reason on its practical, as on its theoretic side, is that which makes for coherence, connectedness, harmony. It forms experience into a connected whole, and it condemns as irrational only that idea which will not fit into the whole. On the ethical side it is that which makes the unity and coherence among the different and often jarring elements of our nature, and it is to be understood accordingly, not as an authority above and outside of all feeling, emotions, sentiments, and whatever else may impel us to action, but as a principle working within them towards harmony." Hobhouse in "Morals in Evolution."

The civilization of the past was an evolution by natural selection, or the survival of the fittest, handicapped by superstition and credulity. It was, at every stage, an adaptation of a limited intellect, to a correspondingly limited environment. The defects of the present form of it can be accounted for, on the same principle, and they cannot be claimed as not defects, because of their historical persistency. So in the same manner, will the civilization of the future be evolved. It seems certain to my mind that the evolu-

tion toward the natural will be much more rapid, in the future, than it has been in the past; because of the numerous scientific truths revealed to the people; and because the number now doing their own thinking is so much greater than ever before. When the thinkers and reasoners become numerous enough, the less informed majority will follow in the same line of belief. It will necessarily be a higher and better type of civilization, and at the same time, there will be a very much higher, or a more scientific conception of man's relation to the universe. It seems to me that the order of evolution will be:

First:—A better system of education, wherein biology, psychology, and sociology, especially the bearings of these sciences on the welfare and happiness of the human race, will replace all the fantastic and unreal, in the present system of education.

Second.—Following the above, but apparently co-existent with it, as the intellect expands by such studies, the idea of the personal, in natural and human phenomena, will give place to the idea of the natural and impersonal,—the inductive method of dealing only with facts. A brain will eventually be evolved whose "pure experience" will, as Avenarius expresses it, be "deproblematized." In other words, it will perceive only an object, a fact, or a condition that is true, a perception that will be common to all sane people. Delusion will have disappeared.

Third.—Then the personal, in phenomenism, will at the same time change to the general, and racial; as it is now doing, as rapidly as the fast vanishing form of feudalism is giving place to a true democracy.

It will be observed, that the natural code of ethics consists of man's constant correspondence with his

environment, in other words, his reactions to constant sensuous impressions. These are as numerous and constant, almost, as his heart-beats. They must be regulated by the correlations made of these impressions in his brain, and constitute the aggregate of his life and habits. It is thus apparent that these cannot be reduced to a universal written code. The details must be left to the local laws and customs of each community. The principle alone can be stated in a treatise like this. Each response to an impression must be that which will best meet the requirement of the law of evolution, the survival only of that which is fittest under all the circumstances for the welfare of the race, even to the sacrifice of the individual.

Righteousness not personified, including ethics, will develop incidentally and equally with the above mentioned three forms of successive evolution. For a man's proper relations to the universe become apparent by scientific study in psychology and cognate sciences. It will become equally apparent that the highest ethics will be man's best correspondence with that wide environment with which the intellect of man is capable of coming into correspondence; or in other words, the natural use of all the functions he now has, and those he is likely to acquire in the future.

CHAPTER IX.

Limitations and Impediments.

When one reflects, upon the vast amount of investigation, that has been published in the last fifty years, by both scientific and literary authors, upon the most important question that can occupy the thoughts of man, viz., whether the perpetual phenomena apparent to our senses, have anything more than the persistence of force behind them, the philosophic mind is amazed that the scientific conclusions reached, have made so little impression, not only upon the mass of the people, but upon those who are popularly esteemed, as educated and thoughtful. I presume one reason to be, that scientific investigators, at least, the most able of them, are still in a state of scientific speculation, upon many points. They always will be uncertain and agnostic upon very many of the questions that will ever arise for solution. It is true, that they have settled as fundamental truths, such great problems as the Copernican system of astronomy, the nebular theory of Laplace, the attraction of gravitation, demonstrated by Newton, the principle of evolution, laid down by Darwin, and the unity of all nature.

They have demonstrated that life either originated from the inorganic or that it always naturally existed like matter and motion, in some form, and that death is simply a change of form. But this does not satisfy theology. The supernaturalist insists upon tracing man to a personal cause, and conveying him after death in a spiritual form to a spiritual world. He has no patience with science

because its demonstrations fall short of this imaginary scheme.

The origin of that aggregation of qualities which coming through the senses man calls matter is not yet settled, and likely never can be by man. Therefore, the word "origin" in this sense is an interloper in our language. There is an origin of forms, only. If there was any beginning to matter and force, man was not there to see it, and should an end come, he will, long before, have ceased to exist. There was no beginning to nature, and there will be no end; so far as man's knowledge is related thereto. Not having any real control over the forces, that seem alone to have evolved the great variety of forms around us, man cannot bring to bear in his laboratory, the necessary agents, in sufficient quantity, quality, and power, to produce what he sees produced by nature, in new form of substance, daily before his eyes. This fact is seized upon by the theologian, as proof that life, for instance, must have been created by a power above nature. But it is not proof of anything.

Some writers on these subjects assert that a God created and set in motion these natural forces; then left them to work out the results, by the method of evolution. Should this be conceded, exactly the same argument that I am making would still apply, viz., that mankind must adapt human ethics to the laws of nature. For if God does not interfere in the process, we cannot successfully appeal to him for protection, but must, as a necessary and more effective substitute, adapt our lives to the phenomena, by first formulating a true conception of the phenomena; and then by our efforts conforming thereto. We may say that the nebular universe followed its own law, since

no human penetration can discover any other source of that law. The support of the evolutionary monistic theory does not require the assumption of any sources of ultimate cause.

We see life produced every day, evidently by forces that are cosmic in their power, and beyond the control of man, and can see only a natural power at work in the process. Why then is it necessary to assume that there is some power, unperceived by our senses, creating, out of nothing, the phenomena? It is altogether sufficient for us to know that nature, whose operations are perceivable by our senses, does these things. One reason must be, the fear of disturbing the established order of current thought; for fear, also, that the ethics of the people will be thus destroyed. I have given in the preceding chapter my reasons for thinking that ethics will be improved thereby.

Science is making wonderful discoveries now of things that were as mysterious a few years ago as the so-called "Origin of Life." The principle of evolution has made plain many processes heretofore considered too obscure and complex for man to investigate, and it seems to me, will in the future unravel more so-called mysteries, and prove that truth requires, that nothing is too mysterious, or too sacred for man's intellectual probing. Evolution is gradually changing the whole current of thought and reasoning, of the thinking world. In the course of the nineteenth century, the sciences of biology, comparative physiology, psychology, physics, and chemistry made wonderful headway in dissipating the ideas of metaphysical dualism. The revelations of the microscope began to exert an influence on philosophy.

Schwann, and Schleiden, showed that all organic structures are built up of cells. Von Mohl gave the name "protoplasm" to a substance lining these cells. Thus, a basis was being built, for the theory of the natural explanation of life, and the explosion of the theory of special creation.

Professors Haeckel, Jacques Loeb, J. B. Burke, and others are investigating the connection between the inorganic, and the organic, in the origin of life forms, apparently with some success. It will be found that life is a phase of the persistence of force. The discovery will not advance the knowledge of origin beyond phenomenism. It is not essential to the welfare of man to consider an ultimate personal cause.

It is a common saying that man when he constructs the steam engine, or the electric motor, by which industrialism is so much aided, controls the forces of nature. Man in the true sense does not control any natural force. "Correspondence with" is the phrase to use in this connection and not the word "control." By virtue of his larger nervous structure he is in correspondence with a greater number of objective things and their inter-relationship in his environment than any other animal. His erect position is in itself indicative of larger brain and nerves. As stated heretofore, by the freedom of his hands from the necessity of quadrupedal locomotion he has acquired the power to construct with the material so abundantly furnished by nature, tools and implements that still further enlarge his correspondence with the outside world. Kautsky contends that the making of tools which serve for production, for defence, or attack, alone distinguishes man from the lower animals.

He is thus, also, enabled to manufacture from

Nature's abundant matter, other clothing than his own skin. By constructing machinery, to utilize the natural tendency of the forces of Nature, he is greatly aided. But his wheel must be turned by the natural flow of the water, or wind. Steam power applied to an engine must follow the well known natural laws of expansion, and condensation. No power is created. It always existed. The expansive power of heat, moves the piston head, and this power is conveyed by the piston rod, aided by a vacuum, caused by condensation of steam, to the point where the work is to be done. Man simply adapts his labor to the existing laws of natural physics, and does not modify in the least particular the operation of any natural law. His dynamo must be placed in the current of natural change of heat to electricity, and of electricity to power. By his ability to clothe himself, and make fire, he is enabled to migrate to any climate, or to any attainable altitude, and is the only animal capable of doing these things. This greatly enlarges his correspondence with Nature. This larger correspondence is the difference between his mentality, and that of the lower animals. But, when, by long and painful effort, he makes a microscope, that reveals to his mind by the natural laws of optics, another, and before inconceivable world, immediately surrounding him, a telescope which brings within his vision a universe, seemingly unbounded, compared with which, the range of his natural eye is utterly insignificant, it is apparent how vastly, and importantly, his environment, and his correspondence with it, have been enlarged. He is thus not changing, nor controlling a single law of Nature; but by means of known natural laws, and following the wellknown mechanism of the

natural eye, is constructing aids to his natural vision; discovering things long existent, but before unknown to him. Says Professor Simon Newcomb in "Side-lights on Astronomy", "Modern progress is the result of two factors: discoveries of the laws of nature, and of actions, or possibilities in nature; and the application of such discoveries to practical purposes. The first is the work of the scientific investigator; the second that of the inventor." It will be noticed that Professor Newcomb in this quotation is careful not to say that modern progress consists of man's control of nature, and its law.

Man's discoveries reveal to him no place he could attain and be above nature, nor any supernatural power controlling nature. They give him no control over the forces of Nature. They reveal to him, what before existed, prior to his advent on the globe, and these new discoveries, by reacting on his nervous system, enlarge that, still further, for achievements in the same direction. They do not reveal to him a reality beyond appearance; and only teach him that still beyond their reach is a greater natural, and material, realm, without limit, the truths of which seem impenetrable to any contrivance, within the constructive power of man. He not only has no power to change a single natural law, he cannot add to, nor subtract from Nature an iota of matter, or motion. He must adapt his brain, his ingenuity, himself, to the laws that nature has adopted, and never changes; or his tools and machinery will not work. If man could make water run up hill, reverse the direction of the diurnal revolution of the earth, change the climate, or perform any miracle, i. e. suspend any law of nature, then he would be controlling nature. But it

is absurd to think he does so. Light, heat, electricity, the attraction of gravitation, the indestructibility of matter, the persistence of force existed long before man appeared. He is just finding them out, and very feebly is adapting himself to their laws, so far, to an infinitesimal extent. Yet, his true line of development, his true progress, is in that perceptible realm, and not in the direction of the imperceptible supernatural. The occupation of his mind, by the latter, in trying to discover its objective reality, is not only a waste of time, but prevents his real progress in real things.

Another reason why scientific writers have made so little impression on educated minds is, that the idea of the interference of the supernatural in human relations, by centuries of acceptance, has become organic in men's thought, and gives tone, and color to our whole civilization. It may be said that nearly all men, whether they really believe in the supernatural, or not, nominally adopt the view, because it was taught them from childhood, and they continue to believe that way in mature life, because it is uncomfortable, and unprofitable commercially, to be in the minority, and also because it is too fatiguing to the brain to pursue the inductive method, necessary to connect, in their minds, natural cause and effect.

The difficulty in getting any generation of men to adopt philosophical, or scientific, views compatible with the facts, so rapidly being discovered by scientific investigation, is the necessity for revising their convictions. This is stolidly resisted by the average man whose attention is so wholly occupied with ordinary pursuits. The organized opposition to new ideas on these subjects is almost a conclusive

power. Theology has ever stood in a belligerent attitude in the pathway of scientific investigation and progress.

When men, from motives of what is termed "success in life," refuse to investigate these questions, or refuse to declare their principles, if opposed to the current trend; the progress of change, from the dominant metaphysical, to the scientifically reasonable, will be exceedingly slow. What is fashionable is very hard to eradicate. We are still governed by impulses, not reason; or rather by reason, controlled by our self-interest. The molecular motion, of our brains, proceeds in the organized channels inherited from remote ancestry. One is inclined to have sympathy with that mathematician who was truly thankful that he was engaged in work that could not be made useful.

As long as the supposed basis of our civilization is the unreal; or as long as man adjusts his laws and social affairs, upon the presupposed, its superstructure will be to a certain extent a sham; society will be controlled by what will glitter and dwarf, rather than by quiet, unadorned mental capacity. Hence, mediocrity is in power, and wealth, the accumulation of which does not require high-class intellect, and which is entirely ephemeral, is the badge of honor and preferment. As long as mankind is dominated by the idea that man's practical code of ethics is the prescription of the supernatural, wealth and pretention will, and ought to be the controlling power in society and government, and not merit or reason; because the latter will upset the foundation of the superstructure, and, also because, such supernatural authority is always interpreted so as to support human authority, in

all its forms. As soon as the majority of men have mental power to perceive natural causes for all phenomena, either inorganic, organic, or in the affairs of society, that moment, monarchies will begin to crumble, wealth will lose its fascination, war, and, in fact, all militarism, will pass away, and be ranked with other bygone crazes, such as, witchcraft, sorcery and human slavery. It would likely result in the same effect, if all men who really believe in natural cause and effect would declare such belief. When this shall occur man will find pleasure, not so much in fiction, as in the illimitable beauties, and variety of Nature, and her laws. Just as "childish" things are discarded by the mature, so further brain development will change the former views and habits.

Man has been controlled from the beginning of his-
torical time by the dogmatism of assumption. He
thinks he must have a fixed, unalterable creed for his
religious beliefs. It does not suit his present state of
development, to have any uncertainties in his creeds;
and current literature supplies him with the soothing,
comforting lotion of positive assumption; and, in the
absence of evidence, calls it intuition, or inspiration.
A belief in evolution means a new step in the progress
of mentality. Progress means the throwing aside, from
day to day, of what investigation proves untenable.
The hypothesis of evolution has been only nominally
accepted, by the majority of educated and thinking
people, in the last few years. A few scientists, only,
accept it in its full logical meaning. The analysis of
racial descent in life forms, especially, in animal life,
is confined largely to the last twenty years. But the
assumption of special creation, without any scientific
analysis, has been repeated 'daily for thousands of

years. The attempt now being made by those interested, to treat evolution as a question that has no particular bearing upon current theology, as akin to, or not more important than, the discovery of a new planet, or a new application of electricity to mechanics, who assert that the cosmical process was created, but not the individual forms, are not in accord with those, who hold that evolution necessarily undermines the whole structure of the supernatural

What is the use for the acquisition of new knowledge by the investigation of the facts of nature, unless we make a proper application of them in correcting erroneous views heretofore held? All the researches of Darwin would have been largely worthless, unless the great truth of the method of natural evolution, which logically grew out of them, had been given to the world. And what is the use of evolution unless we adopt and act upon its evident teaching of still greater truths? It would be like a community of people, who resided in a malarial district, sending out their wisest men to discover a more healthy region to which they might migrate, and leave their fevers and agues behind. When the wise men report a location where disease is unknown, the majority refuse to migrate, preferring to suffer, with the chills, for the sake of the remedy,—artificial stimulants and tonics.

Superstition today, in a less degree only, than it ever did before, is devouring the valuable time, and best thoughts, of a large majority of the people; who nominally acknowledge that evolution is true; yet refuse to part company, with the old assumption of the control of phenomena by a supernatural cause. From the first book, painfully written out by the

tedious process of hand writing, by the monks of old, who were the most superstitious and credulous of mankind, down to the latest edition of yesterday's New York dailies, the aggregate thought expressed, is based upon the unquestionable, so called, intuition of mankind, that everything has been specially created. Not only the ordinary, but our best literature is saturated with it. No textbook can be introduced into the most of our common schools now, that casts a doubt upon it. Is it any wonder then, that when it is suggested to our so-called educated men, and brightest teachers of the young, that the new theories may be true, that the answer almost invariably comes, "I prefer to believe that man was created in the Garden of Eden, and let it go at that," or "the theory is probably correct but premature". One intelligent lawyer said, "The scientist may be correct, but I believe in the confession of faith,—the thirty-nine articles. If there were forty-five of them, I would believe all of them."

Myths should be taught and held up as myths. Truths only as truths.

There is absolutely no further excuse for competent scientists to treat these great questions in a compromising manner. They are of too great importance to the welfare of mankind to admit of an interpretation that can as well be applied to one belief as another. Just as soon as the chemist demonstrated that the body of man, all his nerve structure, the organs of his body, are composed of the same elements that make up all other forms of matter, and that these chemical elements at death enter into chemical combinations with other inorganic substances, that moment the theological idea of the "soul" as an entity took its

flight to the realms of superstition. Even Darwin regretted late in life, as we learn from his published letters, that he "truckled", to use his own expression, to the prevailing sentiment. The only proper basis of thinking is that of inductive scientific method, that is,—truth established by systematic investigation through the senses, and then to adopt the logical conclusions resulting from such scientific knowledge.

Psychology teaches that no ideationally initiated ideas could arise, without experience, which consists in the correspondence of the individual with environment. It is certain, that whatever thoughts, or vagaries, or imaginations man indulges in, when analyzed into their simple elements, are found to be composed of sensations, or modifications of them, that came to the race, during its whole existence, from real objects in the environment. No man has ever been able to imagine an angel, or a spirit, or hobgoblin, or any myth, fable, fiction, or any other thing, that was not a modification of some real thing, that at some time made a sensation, through one, or more of his senses, upon his nervous structure, or upon that of his ancestors. The idol of the idol worshiper, however grotesque it may appear, is, at least, a faint resemblance to a man, or animal. The spiritual God of the most intellectual of mankind, however far away, or obscure, he may be; however mighty, omnipotent, is the enlargement, to infinitude, of the finite man. The human mind cannot conceive of any other God. Angels have female faces, wings, and flowing robes. The devil himself is in the form of a man, with horns, and a forked tail. The most imaginative work of fiction is simply a modification of the real. All this proves, that the mind of man cannot by its utmost

effort go out of the realm of the actual. His true knowledge consists of his correspondence with the natural. The chords that make that correspondence are the human senses, and scientific knowledge consists in seeing the actual, or natural, only. The inference of these statements should be obvious to the most casual thinker

Why should mankind longer consent to attach its natural morality, its education, its day of rest from labor, more than half of its printed books, in short, its thought, to a myth, or a subjective idea, that has no inductive scientific evidence of its objective existence? It is a perversion of the life of man; it excludes the study of the real. The universe is full of the most important truths, to which the most of mankind pay not the slightest attention. For instance, men know so little of their physical organization, that half of them die in infancy; yet, in pure superstition, they will attribute death as they do the origin of life, to the supernatural. For natural things he does not understand, man refuses to make any natural investigation; yet will devote his whole life to a blind belief in, and pursuit of, the old fallacies; giving them the thought and study that should be devoted to the natural.

There are school districts in the United States which have refused within the last few years, to have modern geography taught, because it is in subversion of the account in Genesis. Some colleges will not teach biology, as modern investigation has established it, for the same reason. I have seen it stated that the books, teaching the Copernican system of astronomy, were under the ban in the papal state as late as 1822.

The president of a literary club, in a certain city,

refused to have evolution considered, because the Bible, in a literal sense, was not to be questioned. Politicians are necessarily loud in their approval of the orthodox view, because the majority hold it. A candidate for the nomination for vice-president, before one of the political conventions a few years ago, took occasion sometime since, on the lecture platform, to denounce the naturalists of the Darwinian school because, as he conceived, they advocated that might is right; meaning that the law of natural selection, or the survival of the fittest, was that the strong will survive, and the weak will die. It appears to me perfectly plain that any one can see that such is the law, whether it is natural, or controlled by the supernatural. The facts, as they exist, are in condemnation of his own God; for Darwin only wrote what existed under every one's eyes, and not what he would desire the facts to be. My observation is that the advocates of, and believers in, the Darwinian theory are; as gentle Darwin himself was; strongly opposed to the idea that might is right among mankind, in the sense that the strong should oppress the weak in any way. They are, themselves, the best examples of altruistic evolution. Altruism arose with the development of associations of mankind, the gens, the group, the tribe, in the period preceding civilization; and in the monogamic family, and the state, afterwards. It is confined as a principle to personal ethics. But natural selection, and the survival of the fittest, is a principle of universal application. Cosmic phenomena are not altruistic, in the same sense that the love of a mother, for her weak offspring, is. The latter is a very small ethical wheel, within the great monistic machinery of the evolution of all things. If it keep

its movements within the harmony of the rest of the machinery, it is efficient. It will not be, if it undertake to run independently, or if it "short circuits" to another supposed power, located outside the cosmic energy. But the same politician at the same time was advocating, (1899), with the same gyratory eloquence, the expansion of the trade influence of the United States by the use of the military arm of the government in subduing weaker peoples. Thus the best thought of the world is stifled by misrepresentation. Its freedom in seeking for the truth is absolutely prohibited. No man is allowed to express other than orthodox views, without being made to feel the disapproval of the majority, whose lives are governed by the old dominance of fear. Is there anything strange, then, that Darwin, Spencer and Hæckel have comparatively few open followers and defenders? The historical fact that men have heretofore always been more superstitious than now, proves that the power of the average human brain to discriminate the true from the false is increasing. There is no question but man does the best, in this regard, that he is mentally capable of doing from age to age. But scientifically this condition is deplorable, and it is the duty of every one who clearly perceives the condition, to do what lies in his power to proclaim the facts, as shown by inductive reasoning.

It must be acknowledged, however, that the great impediment in the way of a proper conception of the relation of subject and object, is the historical fact that society in all its forms of government, social customs, statutory laws, literature and art is crystallized around the old conception of religion, as worship

of some personality outside of, and more powerful than, even the great forces of nature

"How could the peasant relieve himself of his invincible superstitions, to which he was condemned by his immediate dependence upon nature, and his mediate dependence upon a social mechanism unknown to him; and by his blind faith in the priest, who stands to him, as a magician and a sorcerer?"* For the word "peasant", above, substitute the words "average man", for all mankind were bound by the same irremediable limitations of brain structure. But those who, by their power to enslave others, and to appropriate the production of wage earners, refuse to have the masses taught science and reality, are the ones really responsible for the continuance of this condition.

Phenomena have been lost sight of, in the infatuation of the masses for a form of worship, or propitiation. The church, therefore, is an evolution from this, what is popularly called the spirit of the people. The Bible is the literature of it. Cathedrals, temples, and fine church buildings, are the physical expressions of it. And these, at the same time, are physical expressions of the poverty and superstition of the common people, whose hard labor, and monetary contributions, have gone into them, instead of into better homes, better schools and better life methods. The numerous grand cathedrals, of old Mexico, rise beside the hovels of those who built them, and who prostrate themselves before their exploiters. It is the same with the old countries of Europe. Sunday, the only day of rest of the mass of Christendom, is devoted to supernaturalism.

* "Materialistic Conception of History", by Labriola, pp. 208-209.

The only recognized code of morals is attached to it. In most governments it is made national, and is therefore woven into the laws. The patriotism of the people is made to depend on it. It is a large part of the constitution of England. France only now has awakened from its delusion concerning it. In Buddhistic countries, like Japan, the only real thing to the masses is the Buddha. The individual is lost in the communal, and the sacrifice of life upon the battlefield, is only a shedding of the outer wrapping of the soul, and its birth into a happier, and better life. The present is of no moment. All effort must be for the future life, or for the transmigration of the soul into a higher organism. These teachings are fascinating to the average brain. The simple, and guileless, whose lives would be pure and beautiful ethically, under any doctrine or system, who so implicitly believe, make the delusion itself attractive and plausible. The Cotter's simple and pure life, as depicted by Robert Burns, in "Cotter's Saturday Night", or the faithful characters in the "Bonny Brier Bush", are designed, by arousing the emotion of sympathy, to make the highest intellect approve a myth, that appears to produce such happiness and contentment. But it is only in appearance. When all the hope of improvement, by self-assertion, has departed from the human mind, then resignation, and meek waiting for supernatural salvation, appears to be the highest virtue.

It is said the Japanese are happy, cheerful, self-denying, to the extent of annihilating individuality, and never think of denying the validity of the Buddha. Competition seems not to exist in Japan. Now, are these conditions, prevailing under both Christianity and Buddhism, the ideal ones, or is it better to encourage

investigation, self-reliance and intellectual development? If the masses were moved, in the same degree of enthusiasm, for the investigation of natural cause and effect, what would the effect be upon civilization? It is, also, well to remember that the cotter, and all similar characters would likely be the same under any system, scientific, or mythical. They are naturally organized for a contented, simple life, and would live such a life under any conditions. They can, then, be eliminated from the consideration of the important question at issue. In contrast with the above attractive features, that have crystallized around the supernatural cult, let us take a glance at the obverse side of the picture,—the spirit of intolerance that dominates the fountain heads of the system.

St. George Mivart, who lately died, was an eminent English naturalist, and at the same time a devoted member of the Catholic church. In 1871, he wrote a work on the "Genesis of Species," in criticism of, and in opposition to, Darwin's theory of natural selection. Darwin noticed him as an able opponent. Just before his death, Mivart wrote a magazine article, categorically reciting, what havoc science had made, with certain statements of the Bible, such as the whole account of the creation, and the Garden of Eden; yet claimed, in the article, that thereby, no breach had been made, in what, he termed, the continuity of the church.

The Catholic bishop, under whose spiritual dominion Mivart lived, violently attacked him in the Catholic periodical, calling his integrity in question. Mivart replied, demanding a retraction of the aspersions upon his honor; and the bishop answered by demanding of Mivart a retraction of the statements

in his article, and sent him a confession in writing, of the tenets of the Catholic church. Mivart had the manhood not to sign the retraction, but was placed under the ban of the church, which embittered his few remaining days.

This occurred in the year 1900. Here was a scientist of intellectual ability, who was so influenced by his lifelong church complications, his family being devotees also, of that faith, that he refused to see the logical consequences of his own investigations. The statements he made, in his article, swept away the very foundations of the Catholic church; and yet he insisted that they made no breach in its continuity. What he should have done was to acknowledge the logical results of his scientific investigations; and say that he could not consistently remain in the church. He should have stated the truth, as he scientifically saw it, and should have declared that he saw no evidence, and could not believe in, the control of a supernatural power. This would have given him the respect of all sides to his memory.

There is no half way station from the tenets of the Catholic church, to the free realm of scientific phenomenonism. The continual effort to reconcile the truth to the assumption, will forever prove futile. Yet, if it be true, which I doubt, that most mankind must have the restraining influence of the church, to keep them from committing crimes, then let the church continue for these, until the descendants of these become, by heredity, and education, convinced that doing right for the right's sake, will best serve any God, whether natural, or supernatural.

If the ideas of supernaturalism, as embodied in the church, are the real promoters of a true civilization, then

the ideal form of government would be the state church. Yet the history of the church, as a hierarchy in temporal power, is the history of the dark ages. The state church will soon be a thing of the past by the fiat of the people. For, as the people everywhere attain to power, the state and church, heretofore joint rulers, and in early times the church alone the ruling power, are divorced by the decree of the people themselves. This fact would indeed be an anomaly, provided, the doctrines of the church, viz., supernaturalism, were the real roots of a desirable civilization. Supernaturalism is the very foundation of the church; ethics a mere appendent. It is also plain, that as the arbitrary power of the church is thus curtailed, the educational institutions become less and less sectarian. Education should not be under the control of the church. When Cornell University was first established, its founders, Ezra Cornell, and Andrew D. White, publicly announced that it would be nonsectarian. The church's opposition to this proposition soon led Mr. White to defend the nonsectarian idea with his pen. His great book, "The Warfare of Science and Theology," was the result of this defense. The new Carnegie foundation refuses to assist sectarian schools."

The real question is, how to produce an uncatastrophic change, not only in the beliefs of the people, but in the ties that still bind church and state. Surely not by open defiance, and so-called blasphemy. Not ridicule; not controversy. Controversy is the continued readjustment of definitions, to fit the preconceived ideas of the asserter of the theory, or to ward off the ingenious objections of the adversary. There is no controversy over facts apparent to the senses. Great truths have been established by induction only.

This is the way the Copernican system of astronomy, the attraction of gravitation, the evolution by natural selection have been established. It can not be done by direct attack, but by making plain the facts of the opposite truth. There must be a natural cause, the want, in the human brain, of inclination to investigate, founded on the principles of evolution itself, which produces such beliefs, when the whole world, at a certain stage of its evolution, adopts them. Their evolution has been slow, so must their decay be equally slow; because sudden changes are always followed by as sudden reactions, and natural evolution does not operate suddenly. But nevertheless, their decay seems sure. Their existence depends upon ignorance of the true sources of human development; and consequently of the objects of life. Education should be directed to the natural,—to the meaning of the great principle of evolution in all its phases. For the principle of evolution, which is now accepted as established as unquestionably as gravitation, entirely subverts the whole accepted (theological) theories of life, and conduct, heretofore held.

No sane man wants suddenly to upset the organized beliefs of the world, even if he had the power to do so; but the masses must gradually be educated into a constant study of the natural causes; and as fast as they perceive that there is a natural cause for every phenomenon, the supernatural, before in possession of the mind, will fade away; until then, there may be reason for either stricter state control, or the constabulary of the church. Many scientific men make the great mistake of supposing that this advance can be accomplished by endeavoring to reconcile scientific truths, with old geocentric ideas. When the descent of man was placed

upon an evolutionary basis, every writer, who was convinced of this process, should have at once stated that special creation was a fiction. The work must be bravely prosecuted in a proper manner, by the successors of such scientific pioneers, as Copernicus, Galileo, Newton, Darwin, Spencer and Huxley. Herbert Spencer has done a wonderful thing to uncover the false, and disclose the truth, by writing his great work, "The Synthetic Philosophy." His readers are few, because the thinking of mankind, heretofore, has been along lines so different from his, that most men do not know what he means. They cannot comprehend that what has heretofore been assumed, without a thought otherwise, to be the work of the supernatural, has really had a natural and explainable cause, comprehensible, upon proper investigation, by ordinary minds.

All that is necessary is to induce the people to read standard works on astronomy, geology, biology, psychology, and natural ethics. When the works of Darwin and Spencer on evolution, Huxley on the "Physical Basis of Life," Haeckel's works, Ribot's psychological works and Joseph Dietzgen's "Positive Outcome of Philosophy" shall be studied by the people, there is little doubt about the gradual establishment of the conception of a natural cause; as the former conception of the supernatural fades away, before the inductive reasoning of these great authors. In other words, the erroneous theological beliefs of a people are only changed by education along scientific lines in the great realm of nature; not by controversy over technicalities; nor by showing the literary falsity of human history. When the intellect is thus convinced, there is little danger of a reaction upon character in way of abandonment of a proper moral code.

Whoever has intellect enough to comprehend the full meaning of the theory of evolution, also will perceive that the wholesome checks, heretofore given by the prevailing theology, through the simple emotions of fear, anger, affection, and the sexual feeling, and their numerous and complex combinations in the human organism, are not indissolubly connected with supernatural beliefs, but must be, as a matter of self-preservation, as well as a wholesome regulation of society, perpetuated under any, and every system of belief. A system of natural ethics, fitted to the highest welfare of the human race, will naturally grow out of a true conception of the laws of nature, and man's evolutionary relation thereto.

But if a man, who has heretofore kept the letter of the decalogue, simply because it is prescribed by a supposed supernatural being, who has the power, and inclination, to punish him, in some unnatural way, for violations, becomes convinced suddenly without intellectual, or scientific evolution into a higher conception, that the decalogue has not the high origin, and support, attributed to it, he is very liable to conclude there is no morality, and act accordingly.

Therefore, the only hope is to educate simultaneously along the parallel lines of natural phenomena, sociology, and ethics. Spencer's "Synthetic Philosophy" only includes biology, psychology, sociology, and ethics. But as there were, already, prior competent works on physics, treating of the nebular theory, including astronomy, chemistry, geology, etc., it was not necessary for Mr. Spencer to include them in his system. But a complete, a rounded, and all-sufficing education that will teach the man, first the significance of Nature's perpetual apparition, and sec-

ond, his proper relation thereto, including his relation to his fellow man, as a part of phenomena, is absolutely necessary to that highest, and best life, in which men will do the right for right's sake.

It has been said, that if man is an evolution, and all his psychical processes are functions of his material body, he is not a free agent and must be irresponsible for most of his acts. He is responsible only to the natural laws of his evolution, for violations of such laws, but is responsible to organized society, for disobedience to ethical laws, and the laws of the state. The highest and most desirable civilization requires the natural man to conform to certain regulations for the good of the whole. He is responsible to the state in civil matters. The word "responsible" implies man's dependence on a superior personality, who determines what his punishment for violation shall be. But if Nature, only, reacts on his body for violations, the word "responsible" is not applicable, in this connection. An insane man is not responsible to society for his acts. Yet, he is practically punished by being confined in an asylum. In the popular acceptance of the word, man is not responsible for his birth, location upon this globe, his heredity, the size of his brain, body, hands, and feet. Neither is he responsible for any variation in structure and consequent peculiarity of character, which his ancestors did not have. Yet, it is obvious, that if this variation is not useful to him in the struggle for existence and as a member of society, he must suffer for it. This is a law of Nature; and while it may seem unjust to the individual, yet it is mercy to the race, because the elimination of the weak, and unfit, is absolutely necessary for the welfare of the whole. In all forms of life, vegetable and animal, immense

numbers never arrive at maturity. In fact, very few survive to perpetuate themselves. The greatest seeming waste is in the vegetable kingdom, but all through every grade of animal life, up to complex man, the principle holds good, that the individual is sacrificed to the welfare of the race. How many of the human race die in infancy? Those that do so, are in some way unfit, that is, when certain tests are applied to them by the inexorable chemistry of Nature, they prove unequal to the test. In other words, Nature holds them responsible for all natural violation of her laws. It is evident that men are not free enough agents to avoid these every-day occurrences.

In some way their organizations are out of proper correspondence with the requirements of life. In many individuals, this fact would be very difficult to reason out, or to detect just at what physical point this want of correspondence occurred; but undoubtedly that theory contains less doubts, and uncertainties, in explanation of the facts, than any other that we can adopt. Of a thousand human beings born, suppose only one lives to be eighty years old. It is scarcely possible that the ablest physician could, at the beginning of the thousand lives, have selected the one to survive. During an epidemic, like cholera, certain ones are affected with it. Some of these survive, and the others die. Why is it that a large number, seemingly equally exposed, do not have the disease, and why do only some of those, who are attacked, survive, while the others die? Is it not something in their complicated organisms, difficult to be observed by the common eye, out of harmony with their environment, that causes the deaths? Any latent weakness of any of the organs of the body, by which the

functions of the organs are weakened, constitutes their want of correspondence with the environment, in this sense the word "environment" has a very wide and significant meaning. All disease, and all weakness, of every nature, are impairments of that correspondence, which a strong and perfect organism maintains, with equal strength and perfection, with his perpetual environment. The brain, that does not perceive the true cause of every effect, is in precisely the same manner wanting in proper correspondence with its perpetual environment. The action of such a brain is subjective only, whenever it attributes to a fanciful and unknowable cause, any natural effect. That is, it is out of correspondence with any objective cause, for objective phenomena. The punishment follows naturally, whether the individual is what is called a free agent, or the product of evolution.

That is, the facts above recited are occurring habitually in spite of the asserted personal control from above. They are consistent with the theory of evolution, but not with the theory of an all-wise, and loving care, by a personality.

One impediment still remaining in our country, is that, while theoretically there is freedom of thought on religious matters, and while in name, and in many respects in reality, we have free churches, free schools, and free speech, yet a majority of the people, as individuals, and as organized societies, have retained the spirit of exclusiveness, and proscription which our fathers intended to prevent, by the words of the Constitution. Religion is not free, until there shall be no question made, as to man's opinion upon such matters, provided he maintain the character of a moral, and upright citizen. The higher criticism should be

encouraged. Schools are not free, until they are open to the proper investigation of all subjects, sacred and secular, along the lines of true scientific methods. The test of morality should be a man's attitude toward his fellow man, and all animal life on the globe, in short, his attitude in general to his environment, not his beliefs, or unbeliefs, in the supernatural.

It is evident to the most casual observer, that the prevailing curriculum, of school and college, does not sufficiently teach these truths. The classical and mathematical course does not reach them, and it occurs to me, that this course is, perhaps, unconsciously maintained largely, because it does not lead the mind away from the established conception of the reign of an imaginary supernaturalism.

Andrew D. White, in his wonderful book, "The Warfare of Science and Theology," shows that the world today would be held in the strong grip of the most disgusting theological superstition of the earliest ages, if the church, either Catholic, or Protestant could have had its way; and that every step of emancipation from such ignorant thralldom, has been forced upon theology by the investigation of scientific men. None but those who have made such advances, as will enable them to comprehend such writings, and do the right for the right's sake, should make this change of belief, and in reality none others will. Of course, there are a large number who refuse to be restrained in their desire to do wrong, by the fears, and espionage of the church even; or by any other organized constabulary; and who have no intellectual conception of the real situation. But these will remain nominally under the control of the old belief, and its code of morals, and also under the ban of human laws.

Those who are incapable of thinking, as well as those who refuse to think upon so momentous a question, may as well be eliminated from the problem

All people should do their own thinking and investigating; and not hand that duty over to a special class, established and protected in many countries, by the laws, whose prime interest, as professionals, is to preserve the old assumptions; who must necessarily oppose all education, destined eventually to undermine the superstitions still saturating human conceptions

CHAPTER X.

Summary.

The foregoing chapters contain only the merest outline of the great principles of Phenomenism. They are designed merely to suggest. Knowing what mere suggestion will do in the subjects of hypnotism, and somnambulism, it leads one to reflect that perhaps those brains uneducated in science, but properly organized, may be induced by these outlines to a more profound investigation of these great truths. There are certain points, casually referred to, that should be further elaborated, and in doing so it may be well to summarize the facts and arguments.

In the realm of phenomena there are only two phases—self and not-self. The perceiver, and the objective phenomena perceived, are the fundamental aspects of one great truth,—the integration and dissipation of some thing, which, for a better definition, we divide into two aspects, called matter and motion. But scientists are fast concluding that they are one in reality. The hypothesis has been formulated that whatever this oneness of matter and motion may be it probably had no origin, and that in its primitive state it was a nebula of attenuated gas, from which, by the laws of energy, the present solar system, and all systems in the universe have been evolved. This original nebula

was composed of either atoms, or centers of energy. The fundamental property of these centers of energy is condensation. Hence, the condensation of the nebulous matter into the globes now moving in space, and all the phenomena, thence resulting, have been simply the operation of a principle immanent in the matter itself. The globe on which we dwell is a condensed portion of a nebula. The sun, and the other planets of the solar system, including the asteroids, are the remaining parts of the same nebula. The sun is still condensing, and the heat of it is produced by the arrested motion of the atoms in process of condensation. All these bodies are composed of essentially the same elements; and these elements are the chemical combinations of the original atoms, or centers of energy, in proportions varying with the nature of the resulting element. After the earth had attained its present outlines, density, temperature, and differentiated its components into what are commonly called solid, fluid and gaseous, that is, into earth, air and water, life began to appear in the lowly forms of vegetation. From this humble beginning all the forms of the vegetable kingdom, and the animal kingdom, have been slowly evolved. This evolution has occurred from the comparatively homogeneous to the heterogeneous in apparently an undesigned progression from the simple to the complex, not in a straight and unswerving upward line, but by rhythm of motion, which seems to be functional, and universal, in all natural phenomena.

This progressive evolution, of life forms, is accomplished by the methods of heredity and variation. These two laws operate effectively in producing more and more complex organisms by eliminating the weak,

by a process which we call death. A constant alternation of development, by integration of matter, and death by dissipation of it, during which the motion or function accompanying the two opposite methods undergoes the reverse process, has been going on from the formation of the first vegetable cell to the present time. This integration of organic matter occurs by a multiplication of cells, and a differentiation of the growth into the heterogeneousness of organisms. Thus, the great variety of species now existing have been produced by the adaptation of an occasional variation in the anatomy, and a corresponding variation in the physiology of the hereditary forms. Whenever the variation proved of benefit to its possessor, in its struggle for existence, that organism proved more likely than its less favored companions to live and multiply. This is the principle of natural selection, in the struggle for existence, and is the theory now generally held by scientists, as one most likely to account for the evolution of new species

As Charles R. Darwin and Herbert Spencer were the two most conspicuous champions in the world of science of the theory of evolution a chapter is devoted to each of them. It is not necessary here to enlarge upon what is said in those chapters. Both have written elaborately and from different standpoints the most logical and convincing treatises on evolution. Mr. Darwin's "Origin of Species" was epoch making. Mr. Spencer's "Synthetic Philosophy" extended the application of the principles of evolution to Psychology, Sociology and Ethics. Lifting these sciences from the hopeless chaos of former *a priori* theories to the high plane of scientific treatment, he brought them into the reach of common sense. From the meaning-

less gropings of so-called intuitions, and supernatural origins, he brought the study of the human mind for the first time to the basis of function of nerve structure, in its relation, through the sense organs, with objective environment

The evolution of what is called physical life has long been recognized, and acquiesced in, by the educated theologian. But for a long time after this acquiescence the psychical life was still deemed unexplainable by natural laws. Modern psychology, however, has demonstrated the dependence of psychical, or as formerly called mental life, upon the physical, and that these phenomena are as much under the operation of natural law, as is physical life. This is so whether psychology is to be considered a science in itself, or a branch of physiology. Whether we view mentality as like, or unlike, the condition we call matter, yet the facts show that they are inseparably connected in function. They so perceptibly fuse that it is impossible to distinguish the line of separation. The substrate of mental operations, as Wundt calls the nervous structure, is so defined as matter, as to pass through certain motions simultaneously with every psychical phenomenon. This phenomenon is so closely connected with the motion of the nerve tissue, as not to be distinguished as a separate existence. The complexity of the matter is perfectly parallel with the complexity of the phenomenon. The effect of the molecular motion of the living nerve tissue is the mentality, and without this motion it is not apparent to the senses. In fact, we do not perceive anything in the operation, except some material fact, i. e., the movements, of the material body in thinking, in articulating or writing words, or in muscular motion. The whole perceptible opera-

tion of reasoning is the production of images, and the fusing of them in the brain cortex. These images are produced by molecular motion, or a movement of nerve elements similar thereto.

So, it is of the utmost importance that the phenom-
enism of mentality, or consciousness, be largely con-
sidered in its relation to its substrate of neural struc-
ture, and in its conformity to the natural laws of evolu-
tion. For if it is a function of neural structure, and,
in its more complex and obscure form, is never mani-
fested, except in connection with a like complex and
obscure physical structure well known to brain anat-
omists as the cerebrum, then it must be deemed
as much a product of natural evolution as the cere-
brum is. Here science finds, as in the physical realm,
only phenomena, and postulates only a reign of nat-
ural law. Not only the normal workings of the psy-
chical life, but the abnormal phenomena, such as illu-
sions, hallucinations, hypnotic states, somnambulism,
etc., are shown, by the experiments of the psycholo-
gists, to be explainable by natural law, not as the
work of a supernatural demon, or evil spirit. The
idea that any psychical phenomena, although so faint
as to be called subconscious, and therefore very ob-
scure, can have a doubtful thither side opening into
a supernatural realm, is a surrender of the postulate
of the universal reign of natural law, in all phenom-
ena. The so-called supernatural phenomena of reli-
gious conversion, the spiritual vision, etc., are natural
abnormal psychical phenomena explainable as the psy-
chology of religion. It would appear, that these his-
torico-abnormalities are much less common than for-
merly. Later, by the evolution of more intellect,
under which the emotions will be better controlled,

these abnormal manifestations will altogether cease. The joy one feels, in the attainment of any much desired condition, such as the control of his appetites and passions, or the discovery of a new thought, or a new method in political economy, by which the material, ethical, or aesthetic condition of mankind can be changed for better, as well as the religious emotion, depends in its outward motor acts, altogether upon the control the intellect has of the emotions.

All real progress is a natural process of reasoning, by which one is converted to a new belief from a former one. Reasoning being the fusing of images naturally made upon the brain, whether real or hallucinative, all conversions, secular or religious, are psychologically alike. Whatever appears supernatural in the sudden change, in psychical life, can be paralleled in the mystery once surrounding certain physical phenomena, whose natural cause is now well understood.

Since Herbert Spencer wrote upon these subjects all thinkers have modified their views of them. "Faculties" have given place to "brain function." "Mind" and "soul" have been transformed to consciousness. "Reason," "Memory," "Imagination," "Will" are presentations, or images, fusing with immediate sensations, forming physiologically those psychological effects named perceptions, conceptions, and ideas. Some psychologists are substituting "immediate experience" for the term "consciousness." "The self" is no longer an entity that thinks. "I think," as a phrase, is imperceptibly fading into the more logical, and rational, "it thinks,"—being the reactions of brain structure to sensations and images. We cognize, not by intuition, but by the physiological exercise of the old-fashioned senses of touch, sight, hearing, taste and

smell. Our instincts are inherited automatic reflexes of nerve structure. The emotions are the same. In short, all former so-called mental acts are the reactions of the brain centers to sensations, by which such centers are indifferently excited to produce images of former like sensations. These images fusing produce a new, and different, image, which is the idea, the perception, the conception, the abstraction, or the motor action. Of course, there are idealists, yet existing, who refuse to believe that these psychic effects can be produced by the machinery of the nerve structure. They say, the psychic phenomena are accompanied by a nerve motion, but the two are only parallel, and simultaneous, that the two operations are independent. They say that a machine that turns out a piece of cloth different in pattern from the material put in is not the maker of the pattern. True, but the human brain is the maker of both the machine and the pattern. This fact is apparent to the senses, but the patterns of the images of the brain are not seen by us to be made by a supernatural being. The machine is composed of matter the same as the brain is, but it is inorganic, and stable; whereas the brain is composed of organic matter, and is very unstable. It is very responsive to incident forces such as light, heat, and all forms of cosmic energy. Therefore its product is psychical, that is, lighter, less palpable, less apparent than that of a machine made of steel. The illustration of the machine, turning out patterns of cloth, is parallel with Paley's illustration of the same principle, by the watch. It presupposes a personal maker. This maker, in the form of man, is cognized through our senses. But the assumed maker of natural phenomena is not thus cognized. He cannot be the result

of human reasoning. He is only the hope of faith, therefore the illustration not being consistent in its parts fails as a proof. No one objects to the assumptions of faith as long as they are confined to that basis. But when an objective supernatural entity is proposed on the proof of human production, the sensory proof apparent in the human production, must be demanded in the supernatural assumption.

The limitations of human knowledge are the results of man's nervous structure and its limited correspondence with environment through the five peripheral sense organs. These sense organs receive impressions from phenomena only. The images resulting from these impressions formed on the cortex of the brain centers, and fusing into perception, conception, and reason, are not the images of the theological "final cause," but of relativity only. We perceive the thing itself by certain attributes or properties such as form, color, resistance, motion, sound, odor, and taste. The thing thus defined is real to the perceiver and is the "thing in itself." We know ourselves by the functions of our bodies. What we have been calling mind is not a spiritual entity distinct from the body, but is best perceived as the psychical function of the individual organic body considered as a phenomenal ego. Consciousness is a condition, ever varying, produced by the images above spoken of, forming, and reforming, in the sensory centers, by the incidence of objective forces.

In ordinary conversation, and in nearly all literature, the mind is spoken of as a producing entity. Language has been evolved from this conception. That is, there is very little language capable of expressing other than the idea of entity, and the power

of that entity to produce the psychic phenomena every moment observed. For instance, the phenomenon of "absentmindedness" is ordinarily spoken of, as the wandering of the mind. That is, it is a thing,—an entity,—that moves away from the body, or, at least, leaves the object to which the eyes, or some of the senses, are directed. This language does not express the psychical phenomenon taking place, because the present conception of that phenomenon is of recent origin. That is a process, unconsciously and instantaneously occurring in the appropriate brain centers, but which in consequence of its being heretofore unknown to the real makers of language, viz, the masses of articulate beings, requires a new application of words, in a very unusual, and long drawn out combination. In reading a book, for example, the flow of thought is maintained by a constant succession of sensations of words, first on the retina, and thence transferred, by the afferent nerves, to the optical centers of the grey cortex upon which the image of them is formed. These sensitive images call up, or excite, by the law of association, other similar images; but connected, or fused with these latter images are all the images of former sensations called experiences, with these same words, by which the meaning of them have been derived; such as the touch and reading of books, the hearing of definitions of teachers, and all the mechanism of school education. These images of former sensations by similarity, and contiguity, have fused into a new associative image, heretofore called memory, which being similar to the image immediately produced by the present sensation, coming from the book, fuses also with that, and forms a resulting image called a perception of the ideas of

the author. This is the continual psychical process of forming thoughts upon, not only the contents of a book in reading, but upon any objective thing capable of producing a sensation upon the peripheral sense organs, and through them upon the brain. It must be plain from this explanation why it is so difficult for the young child to learn to read. The child is lacking in memory, and former experience. Now, if the associative image thus formed upon the matured brain, from past experiences happens to be so dissimilar to the present sensitive image, as not to fuse with it, the resulting perception of the idea, intended to be conveyed by the language of the book, does not take place, and the attention is absorbed with the non-fusing image of memory,—the mind is said to “wander from the subject.” It is plain, that the latter term being based upon the conception of the mind, as an entity which directly produced the conception, is comprehensible to every one who takes this view of the nature of the mind, and that means the great mass of the people. And being concise, as well as comprehensible, it is the one commonly used. It is further plain, that until the majority, of those who make and use language, comprehend the scientific, and actual, process of the nervous functioning of thought, and reasoning, there will be little effort to frame a language that will convey that idea in the short method expressed, by the term “the mind wanders.” But the evolution of language is trending in that direction. The evolution follows the idea, and something like this will express the true idea, viz, instead of saying “the mind wanders” it will be, “a new image absorbs the attention.” But this will not occur, until the principles, of physiological-psychology, are nearly as well understood as

is now the theological, or ordinary, conception of mind. The same argument will apply to all phenomenism. The scientific view of all phenomena must replace the present views, before language can be changed from the present short cut, but expressive terms of present perception, to equally short cut, and expressive terms of a scientific perception. There lies beneath consciousness a slumbering knowledge, that is aroused only by the image of the words, so arranged as to embody the elements, or at least one element, of that knowledge. This is the result of former work in investigation of analogous theses,—the residuum of education in science. It is evident, that language has evolved from perception and conception. Words symbolize the "pure experience" of the mind. Lower animals reason in their way, and convey ideas without articulative, or written, words. But there are forms of reasoning in its higher human conditions, that would seem to be impossible without language, with which to make, and hold, the psychical continuity. It seems to me, that the language succeeds, not precedes, the conception. Some authors contend that "the schematic products of ideational construction," meaning the higher ideas of normative science, cannot be produced without language, as an instrument of analysis, and synthesis. Of course, we could not have any evidence, of the product of any thought, in the brain of another, without the physical marks expressive of those thoughts; and there is no way of expressing the ideational conceptions apparently formed in the cerebrum, except by spoken or written language. But, just as the ideational centers of the cerebrum, and the conceptual psychic phenomena of the human organism, are simultaneous in appearance;

so is language simultaneous in evolution with "the schematic products of ideational construction." We do not, first, manufacture a language suitable for the expression of the idea, and then mechanically fit the idea to the language; but the brain centers, the idea, and the means of expression are evolved without our cognizance of any orderly succession. This conception is in harmony with the theory of monism in all evolution.

Untrained minds are incapable of understanding the meaning of a profound treatise. Words alone cannot convey the meaning, without the previous work in the intellectual field. A trained mind is therefore in correspondence with a more complex, and subtler, environment, one that brings to such a mind a wealth of discernment, and comprehension, far beyond the reach of those less educated. But there must always exist a structural adaptation to such training, before the organized memory can be established. Otherwise the conceptual images will never,—however long and arduous the training,—coalesce into reason and will. Hence the substrate, as Wundt calls the nerve tissues, is the all-important and abiding thing, in psychical phenomena. If this structure is lacking no amount of training will suffice to make potent the psychic phenomenon which Wundt seems to think is independent of organic substance. Neither will the cosmic energy that assumes, through the persistence of force, such a multiplicity of effects in nature, ever assume the psychic form now commonly called the human mentality in this highest form of organized memory, unless by way of nerve tissue in the cerebral centers.

Phenomenism is the psychological condition existing, being the correspondence between the individual

and his environment. It is also defined as "self" and "not-self." "Not-self" is the realm of phenomena objective to our sense organs, and reaches all things making sensations, or images on the brain centers, from the rays of the farthest fixed stars, to the subtlest reasonings, and the most esthetic judgments, "the schematic products of ideational construction" as well as the most altruistic relationships implied in the expression, "The Brotherhood of Man." Therefore it is this realm of phenomenism that should receive the direct attention of consciousness. It is the really knowable. To keep in proper correspondence with it is the highest wisdom, and the only preventive of illusion and delusion. He who confines his attention to it is sane. The insane are those who claim correspondence with things that have no objective existence. All life depends on this correspondence. In this sense the term life includes every phase of physical and psychical phenomena, viz., those aspects of life treated in biology, psychology, sociology, and ethics. There is unity not only in body and "mind," but in the laws of society and of ethics. The scientific definition of one is the proper designation of all. Therefore a sensible code of ethics is the natural correspondence of self with not-self; just as the proper definition of social law is the correspondence between each individual, and that part of his environment included in the term mankind. Education upon these vital topics must therefore be confined to the knowable realm of phenomena.

The beliefs of man depend upon the development of his brain structure. His discrimination between the true and false depends upon the images recalled by sensation upon the patterns of nerves in the higher

centers; and the coalescing of these images into other conditions called perception. It is a process of reasoning, which depends upon the quality of his brain, and the perfection of his past experience, that is, the quality of his education in the past. But the education of the past has been largely confined to either immaterial things, or supernatural objectivity, or to the realm of the unknowable. As said in one of the chapters, mankind has been in the attitude of childhood on all these questions. It readily believed anything concerning the reign of the supernatural, that was solemnly asserted by either writers, or speakers, who appeared to have a little more learning and boldness than the masses. This condition, of helpless mental dependence, is the same as that of childhood, which believes in the actual reality of Santa Claus. The child grows out of this belief, and is finally convinced that the saint of gifts is only a subjective generic image of a generous but natural giver of good things. The same knowledge will come in time to the brain of mankind concerning all supernatural subjective ideas. It is not necessary to personify righteousness, in order to believe in it. Neither is it required that psychical phenomena should be given a supernatural cause in order to impress their power, beauty, utility and adaptability upon man. Natural cause and effect will produce greater impression. The former condition is rapidly changing now. There is now an environment of scientific literature upon these questions which fifty years ago did not exist, and more and more of attention is being given every year, by students, to natural phenomena. While much of former educational influences still linger, even in the methods and ideas of the ablest scientists, yet the leaven of phe-

nomenism is working. The known principles of evolution demand that the probable changes in beliefs work slowly in order not to be catastrophic in their effects upon future society.

One of the essentials of human knowledge, mentioned in Chapter 5, is that impressions must be made, upon the peripheral organs by objectivity, as a prerequisite to knowledge. In the mature mind the idea may be initiated in one of the neural centers; in which case it will be some form of a former peripheral sensation, and will take the form of an image objective to consciousness. These sensations are conveyed by the nerves from the organs of sense to the neural patterns of the brain, and are there transformed into images of the objective things, from which the sensations are derived. In the infant brain the image, other than color, is comparatively meaningless. But in the mature mind, it immediately excites a molecular motion, which produces another fainter image similar to the first. This is so readily produced that the process is unconscious. The second image is a reproduction of a former experience of similar sensations, and, if the two images are exactly similar, they at once fuse and form a perception of the entire thing, in the environment, in its generic character. The whole process, down to the final perception, is so instantaneous as to be unconscious, and therefore impresses the ordinary brain, as being not physiological, and natural, but as supernatural.

Said M. Taine, "Just as the body is a polypus of cells, the mind is a polypus of images." Each sense forms images, on its appropriate brain center, these being visual, auditory, tactile, motor, etc. The type of the image resulting, from the fusing of these images, i. e., the percept,

depends upon the type of the organism. The degree of perfection of the nerve structure determines the type of the image. The images, so called by some psychologists, are the same as the feelings described by others, and are the result of a process of nerve molecular motion which we interpret as reasoning. "The image is a phenomenon which results from an excitation of the sensory centers of the cortex" "Reasoning is a synthesis of images"*

But, if the image is an essential element of human knowledge, it must be produced by a sensation from a real thing. How then can the induced hallucinations of the subject of hypnotism be explained? The experimenter in hypnotism makes the subject see, or feel, or hear, a thing that does not exist. Likewise the hallucinations of the insane are real images produced by the diseased conductive paths of association, upon the brain centers, not by a demon in the supernatural realm. In the subject of hypnotism the first image may be produced on the auditory center, by the suggestion of the operator, e. g., that the subject is a king. The conductive cross fibers from the visual center† are immediately excited, by the auditory image, to produce any former experiences the subject may have had by seeing, or reading of, a king and his retinue,—in short, all the accompaniments and surroundings of royalty. The variety and complexity, of the associative image, will depend on the intelligence of the subject. The absurdity, and incongru-

* Alfred Binet, "Psychology of Reasoning" p 31.

† "To know, to understand, to explain, to know the why and the how of things—all this culminates in an act of vision." Alfred Binet, in "Psychology of Reasoning," p 172.

ousness, of the image, that is, its departure from the normal, will depend on the degree of lesion of the brain centers, excited to the production of images. It is in no sense supernatural. The voice of the operator is the exciting cause.

Binet and Féré have proved by experiments in hypnotism in the Salpêtrière at Paris, France, that the hallucinations are images formed upon the sensory centers, not true, of course, but they are immediate experiences of the deluded subject. It is the same, with illusions of the sane, e. g., when one person is mistaken for another. The similarity of the immediate image formed upon the visual center, to the one it recalls from memory, produces the conclusion that they are one and the same, by the two images perfectly fusing. The illusion is not dissipated until a new image formed by a closer inspection produces a new, and truer, perception of the true objective. But the hallucination, whether produced in hypnotism, insanity, or in mistaken identity, brings no knowledge, because it lacks the essential element of truthful objectivity.

The importance of this process of sensation, and images, resulting from the conveyance of the sensation to the central cortex, and of the memory of former sensations, cannot well be overstated, because memory replaces the absent sensation, and is thus a supplementary sense.* It is also reasoning, freed from the condition of time and space. Memory is the seeing of the past, as if it were in the present, and reasoning, being a passage from the known to the unknown, is seeing the future. Perception, being the

* Alfred Binet, "Psychology of Reasoning," p 165

product of three images, is parallel with the three terms of a syllogism, and is thus the result of reasoning, and is the same as knowledge.

I should, also, state, in this connection, that several psychologists are now adopting the viewpoint of "pure experience" as best explaining some of the anomalies, and paradoxes, of consciousness. The subtle doctrine of idealism contends that the mind is the only thing,—that there is no reality, in the outer world, as a separate existence. Accordingly everything is in consciousness. But that is not the common sense experience.

When one sees, and touches, a thing, the experience is of the thing where his senses place it. He is conscious only of the thing, or fact, or problem, not of the image on the cortex of the brain. That is "pure experience," and it makes no difference to the "pure experience," whether it is true or not. He may eventually see the falsity of the image, but that then becomes a fact which he perceives. In any event, whoever harbors a delusion as true, is passing through a "pure experience"; as much so as one who sees only the true. As to the contention that the image, or presentation, is the only real thing, this conception ignores continued external existences. It seems to me, that this theory, viz, of idealism, does not take into account, that the forms and substance of the environment remain and make impression on successive generations of sensuous organisms. And the impressions from the same forms are alike to successive generations. The perpetual apparition of the physical universe persists to all organisms that have lived in the past, and that will live in the future. It is true that the only knowledge a single individual has of it

is the impression it makes upon his sense organs, but that it exists as an objective relation to the individual, and as the source of his impressions, is not, only, a scientific view, but a common sense conception. This idealistic theory seems to ignore that inorganic matter existed before there was any life. Of course, the correspondence between the individual, and objectivity, depends entirely upon sensations, or impressions. As I understand idealism, Berkeley contended that everything is "mind," or in the "mind." He conceded that things may exist outside the human "mind," but that all things exist in the mind of God, or in infinite "mind." This is quite logical from the view point of orthodoxy, that God personally controls every phenomenon.

A criticism made upon the chapter treating of "Natural Morality" is that the author ignores the philosophy of history when he minimizes the influence of religion upon mankind. The gist of the criticism is that upon the whole the aggregate influence of the church and all religions has been to raise men to a higher standard of morality, and right action. The influence of the Christian religion was exerted in the churches by the constant preaching,—the perpetual iteration and reiteration,—of first, the creation of man perfect in the garden of Eden by a personal creator of the universe, man's fall, his eventual annihilation by a flood, leaving only Noah, and his family. When, after several centuries, the descendants of Noah still remained as wicked as the descendants of Adam had been, God sent his only begotten Son, Jesus, to die for the redemption of man. That man, in order to avoid the fate of the damned, must repent voluntarily, or be converted. This, in short, is the Christian code of doctrine. The evidence of conversion was, to keep

the decalogue, to which Jesus added the Golden Rule, and the Sermon on the Mount, both of which (the latter shorn of its supernaturalism) appear to have been the essentials of all religions. Such civilization, as we have, is crystallized around the emotions of fear, in the first instance, and affection as secondary. But mingled with this subjective conception of the supernatural, and really underlying it, is the great natural principle of evolution that has been, although unrecognized as such, the natural force that has evolved the brain of man, through all its heretofore uncertain, and partial, correspondence with natural phenomena, to its present more complex correspondence, in spite of its hallucination, that it was possessed of sensory correspondence with the supernatural. As long as this hallucination lingers in man's brain, the civilization is perhaps the best we can expect, and the supernatural religion, being the fruit of it, the only possible one. At least, the advocates of evolution must assume that this artificial, and evanescent, but widespread human orientation, is a condition, not incompatible for the time being with the operation of natural law, in the rapidly changing, and gradually enlarging, circle of human consciousness. In other words, it has its part to do in the natural interchange of matter, and motion, which we call evolution. All the religions of the world have a like part in the great drama.

A study of the history of such civilizations, as Greece, and Rome, shows that what we call a high intellectual and esthetic civilization was evolved without church or spiritual influences, as we understand those terms in the Christian religion. The orientation with those nations was artistic, not Christian.

Yet they created a literature and a code of laws which are today greatly influencing our Christian world. Our classical curriculum in the schools is that of these non-Christian countries. Even science today refers to the conception Aristotle seemed to have of evolution. The first expression given of a human soul, as an entity, was not by the Hebrew religion, but by Socrates, a pagan, 500 years before Christ. The "second entelechy," used by Aristotle, is now being used by some authors as that best expressive of a "soul entity." Entelechy is somewhere defined as "a final end had in view by the exercise of an activity," I presume the author of this definition means human activity. But this seems to be nothing more than design. If, therefore, design in human activity is "soul," when the power of designing ceases there could be no "soul."

Aristotle meant by entelechy the culmination of function—the soul being the final result of the activities of the body. This term is altogether too vague for present day psychology. The psychic functions of the nerve structure constitute the only "mind," or "soul." That function is the metabolic action of the neural molecules, discharging the energy stored in them from the atoms of matter of which they are formed in the anabolic process in living organic matter. This released energy which is constantly, continuously, going on in the living tissue of the body, is its life, its mind, its soul, its thought. It lives after the death of the body, but not in the same form as it does in the function of life. Wherever it is throughout the universe it is motion in all, or some, of its forms. In the human body during its life it takes the form of consciousness, enthroning itself as perception and aware-

ness in a plexus of nerves, which at the same time receives and perceives those forms of energy external to itself. But when this peculiar plexus of nerves loses its form of motion called life, these phenomena of consciousness cease, and are transformed into other phases of energy, having no trace of the function they assumed in the living body. It is analogous to the transformation of motion in the dynamo to electricity, and that into light or heat, things entirely different from the motion of the dynamo. They are all simply different forms of a cosmical energy having no conscious connection with each other. It is evident that the transformed energy of the dead body does not continue the functions it had in the living body.

The educated Christian of today has no better definition of "soul" than Aristotle or Socrates did. Also as further illustration of the effects of other religions on civilization compare the Christian Empire of Russia, with the pagan Empire of Japan. Compare the civilization of the countries, most under the influence of the church, with those least under its influence, e. g., Italy, Spain, Mexico, with the United States, England, France, and Germany. The latter countries are rising into a more desirable civilization, in proportion as they dissolve the bonds of church and state. I have heard no expression of disapproval, by any one, of the separation of church and state in France, except by the adherents of the pope. It is plain to see that the same action is slowly culminating in England. This is no protest against real righteousness among the people. But it is a protest against organized supernatural creeds, whose provisions and sanctions are protected from discussion, by a privileged, and powerful priesthood. It is a protest, against placing around the hu-

man brain an immovable band of rigid doctrine, to prevent the freest expansion of the intellect.

But I repeat that until men come to comprehend a natural cause for every natural effect, they should be controlled in their attitude toward environment, including their brother men, by some power that will have the proper effect. Manhood should be the end, not the means. I am willing to concede this much to the historical inclination of people toward delusion and supernaturalism. This does not mean that any effort to enlighten them in natural science should be lessened. My argument only goes to the extent of showing how much better a natural code would be, in the development of man, by imparting to him stronger, and more efficient, manhood. His intellect would be very much less impeded, and his morality would necessarily be of a higher and broader character than it is now. Of course, this presupposes that men themselves are adapted to such a code. History is almost wholly a chronicle of the delusions, that have controlled mankind. These are monarchy, imperialism, militarism, constant warfare, almost universal slavery. Can it be that these were merely the mobile, automatic expressions of the varying limitations of the human intellect? If so, of course, they were better for the aggregate welfare, than the ill adapted,—an unfit higher condition of natural law and ethics. Yet if the rulers, priests, and teachers, all through historical time, had comprehended, and put in use, a free democratic form of society, or government, in which the natural rights of man as determined by the people themselves, were enforced under the Golden Rule, even the ignorant masses might have been much more able, than they now are, to govern

themselves, independent of hereditary rulers, and supernatural codes. It must be understood that a better and more intelligent comprehension of a code, and its sanction in phenomenism, can come only when the majority are ready for it intellectually. This change will be and should be only gradual, in fact, so imperceptible as not to produce a single reaction. This is the way important evolutions take place. My theory is, that the ancestral line of man has gradually evolved from the lower to higher orders; not only in historical time, but in all time preceding that; from the formation of the first cell to the present heterogeneous organism, classified by Cuvier as *bimana*. There never was a period of that evolution, when the correspondence between the organism, and its environment, was perfect in a way that would be ideal. But very likely it was the best for the organism at the time. It was this that maintained the survival of the fittest, and worked out in a natural way the general rhythmical upward tendency of the line, toward the present culmination in complex man. Whatever the church may have accomplished, in the line of human advancement, would have been greatly facilitated, and broadened, by a natural system of scientific education based on phenomenism only.

Said one who read the chapter on "Natural Morality": "I cannot see that altruism is accounted for by evolution." Altruism, or self-sacrifice, is evidently a law of nature. From the theoretical atom, to the most heterogeneous organism, viz., man, the sacrifice of the individual for the welfare of the race, or the process of life and death, is perfectly apparent. No mere form is enduring. There is a constant change of form, and this is called by us death. This is self-

sacrifice, or in the human being it is altruism. It is not confined to the human being. It is as apparent in the lower animals. But every manifestation of it, is in pursuance of law of nature, the Golden Rule itself being a natural law. Altruism came to the human being, in the form it now exists, after the evolution of the cerebrum, and could not exist without that. It is therefore a natural biological evolution.

Another criticism of "Natural 'Morality'" is, that it appears to one who has felt only the force of the decalogue, and the Christian doctrines, backed by the organized churches, as the declared demands of the Hebrew God, that the natural code sanctioned only by the perception of the individual, as the best for his welfare, will lack proper force to compel obedience. The natural force, in a natural code, is the unalterable character of natural law. When a man becomes intelligent enough to perceive that his bodily health depends on the observance of sanitary laws known to him, he certainly obeys those laws for self-preservation and does not seek further sanction for them. If he does not obey he is unfit, and is soon eliminated. So it will be with physiological and psychical laws,—social and ethical. Before he can obey them he must comprehend their purport. Every violation brings sure punishment. He will thus soon learn, by actual experience of the punishment, that his welfare, and especially that of his race, depends upon his obeying. This reciprocal action of the necessity of the law, and his comprehension of its adaptation to his life and welfare, will work out an individual intellectual development, far more rapid and complete, than any mere acts of faith can ever do. This is really the operation of the principle of natural selection. This is not

the case now. For theological codes teach, that the punishments and rewards are not experienced in most instances in this world, but will be completed in the next. Hence so many lapses from the straight and narrow path. The putting off the punishment to an indefinite and uncertain time, weakens the character. For no man can logically connect the present life with a future life. That connection is merely a theological assumption. In other words, man, under a natural code of ethics, will have the positive force of cosmic energy, or the persistence of force, or natural selection, to hold him in a true line of action, instead of the vague threats of an unknowable supernatural power, as now.

There are some curious methods of reasoning by those who desire to maintain the supernatural, and especially to support the theological view of the immortality of the soul. Said one, "There are so many unjust inequalities in this life. One man will accumulate a fortune by violation of laws, human and Divine, be received into society and live a life of ease and pleasure; while his just and upright neighbor will remain in cruel poverty, be neglected by society, and struggle hard all his life for a bare subsistence. Now there certainly must be another life in which these unjust inequalities will be corrected." To the human brain life is full of inequalities. Man's idea is that all individuals should be alike in the enjoyments and opportunities of this world. But no two are alike. Half of them die in infancy, and the rest live in all grades of comfort and success. The majority are really slaves by nature, either to their fellow men, or to their passions or habits. Nature does not regulate it according to the ethical ideas of man; and, if there is a

merciful providence, he certainly does not interfere in this life. Here is where he certainly should interfere, if at all, and not put it off to another life over which there is no evidence that he would have any more control than he has here. The well known and current history of human affairs shows that there is no supernatural power that interferes in this world to regulate these inequalities. Then what justification have we for concluding that such power has established another life in which he will do this? Even if he did give all that theology pictures in another life, it would be no compensation for the miseries of this. The only effective thing he could do would be to abolish the cause of human misery of all kinds, and not allow such unhappiness to occur in this world. Is it reasonable to suppose he would have any more control over another world than he has over this? Or if he refuses to interfere in this, why should he be expected to put it off to an indefinite time and place, without a good deal better evidence of that intention than mankind now has? But evolution explains the situation much better than theology does. Life is simply a struggle for existence, and the survival of the fittest. Society is a method adopted by man, as a convenient device for aiding him in his struggle. It is better than isolated effort, but is only partially successful because it does not produce the survival of all its members and never will. It will greatly improve the conditions in the future, after repeated trial and failure of various methods. Improvement will come only by the evolution of brain power, capable of understanding all the knowable laws of nature, and of adjusting the human organisms to their favorable co-operation, and not by the interference, or aid, of an imaginary personality,

now being appealed to by the most of Christendom. It will come in this world, and in the material bodies of its recipients, not after death in an undefinable form, bloodless and undesirable, impalpable, and without those human attributes that now make what little happiness mankind enjoys. Besides, if we are to take theology as a guide, then mankind in the aggregate will be no better off in the next world than they are in this. The supernatural power, according to the teaching, will simply reverse in the next world the conditions in this. The great majority will still be made miserable and a few only be made happy. Take the conditions of the two men first spoken of above, whose inequality here, it is assumed, should be remedied in the next world. How should that be done? By making them both equally happy there? That does not seem to be the intention. But instead the one who is miserable here is to be supremely happy and prosperous there, while the unjust man is to be there as his neighbor is here, miserable and most unhappy. Then some philosopher there will say again, "This intolerable inequality here must be remedied in another world." Thus there will be an eternal round of "other worlds" for the mere purpose of correcting injustice, of which perhaps natural laws take no account and for which, there is no remedy except that which society itself should provide in this life.

Man has taken himself too seriously. He has measured up the universe and his God by his own personality. His muscular power has led him to conceive all power as personal. There is a confirmed disposition in mankind to construct hypothetical types, of the order of vertebrates, because he himself belongs to that order. His Adam and Eve, are not the lower

orders from which the scientist derives his ideas of the primitive man. His God is a personal representation of himself, and not the generalization of an abstract principle.

The mobility of his nerve structure in producing a condition called consciousness has deluded him into the idea that all energy must be a conscious personality. His really limited intelligence has induced him to make that the type and criterion of the so-called power behind phenomena. The unscientific writers of theology, including the old and new testaments, have drawn after them the less intelligent who have adopted those views because they know no others. As rapidly as these find out the truths of science a change takes place, not in their moral degeneration or abandonment of true righteousness, but in their intellectual conceptions and freedom of thought.

It is, however, probable that man, being an evolution, fills a certain passing phase of phenomena, and is really but a very insignificant part of that universe which at first he thought was created for him alone. The latter thought is theology. Now science is gradually changing this hallucination into a saner perception of man's true place in nature. When he perceives that he is a part of phenomena and a rather insignificant one, he will only then begin to shape his ideas and conduct upon a true basis. His thoughts, his character, his actions, his attitude toward his fellow man, his civilization, will be completely metamorphosed. His society being his own creation, and his morality his own device under the controlling power of evolution, their sanction, improvement, and remedy must still be his own work under the molding power of the same evolution in this life. Old things will surely then pass

away, and all things will become far saner, and more permanent

I anticipate the stereotyped criticism that man is not comforted by the propositions of philosophy and science. This is the same as saying, that it is more comfortable to let the brain rest satisfied with ignorance, and to be content with the plain assumptions of theology. Reasoning, from the known to the unknown, is work for the brain. If we would be in correspondence with any more than a surface environment, it is necessary to penetrate beneath appearances. As above stated, "To see," is the highest science. But thus to see requires work, and self-denial the brain must be kept active, not with undisputed things, but with unknown things, that can be made known only by the exercise of close attention, and the exclusion from attention of those ordinary pleasures, and commercial pursuits, now so comforting to average man. He takes comfort in leaving the solution of such questions to the clergy, and never really thinking about them himself. But science and philosophy require him to do his own brain work, and the average man is very unwilling to do this. This fact is a great negative power in support of organized theology. Life is not a comfort, but a continual readjustment. Problems are ever before us to be solved. There is no progress in comfort, nor in contentment. Evolution means a struggle for existence. In human affairs, the higher and purer is attained, only after a hard fight, with lower and unfit. Religious and civil liberty come only by hard struggle, with dogmatism and oppression.

"Why assist in up-setting the old faith from which the believer derives so much comfort?" But this comfort is more or less imaginary. He is in a constant

state of fear and uncertainty, as evidenced by his habitual appeals to the "Divine Providence" for help and consolation. I have faith in those things that appeal, and have heretofore appealed, to the senses. I have faith that the earth will continue to revolve on its axis, and that the oceans will not thereby be poured out into space, because for ages it has been revolving, and the mobile oceans while constantly in agitation retain practically the same positions on the surface they have kept since history began to be written. But because of such phenomena we are asked to have faith, not in the persistence of force, but in a personality who is assumed without sensuous evidence to turn the earth on its axis and hold the waters of the earth in the hollow of his hand. It is faith in the fact that gives me comfort, because my senses inform me of the fact. It is purely imaginary that the faith in an unknowable personality in place of the fact gives any comfort. There is absolutely no necessity of any kind in the human brain for going beyond the sensuous perception of phenomenon itself in pursuit of comfort or happiness.

A further answer is that in the nature of man there is a necessity for the truth, and while he is governed by delusion there is a want in the power of his intellectual development. The world was getting along in a blind, stumbling way quite comfortably under the old astrology and alchemy. But who would now wish to revert to that state of society when the true knowledge of astronomy and chemistry did not exist. If the cessation of this old faith was being followed by mental vacancy upon such questions, there might be some logic in the contention that it is better to let it remain undisturbed. But when science is showing the

absurdity of creeds, and giving in their stead a knowledge of natural cause and effect, leaving the essential ethic undisturbed, any thinker can see that as the latter gradually becomes conscious to the believer in the old faith, he has something worth while to take the place, and give an immense impetus to free thought and the development of correct reasoning. As I have before said, the old faith is better than blankness to those incapable of comprehending the new, or who by the tendencies of their perverse brains need a moral restraint upon their emotions, in the form of fear of future punishment. The evolution, therefore, will be, like all other evolutions, one of slow adaptations of numerous variations of the heterogeneous brain, giving the innumerable phases of its psychic phenomena time by heredity to finally so adjust themselves as to make the truth plain to the great mass of mankind. In the process, there will be wrecks without number, but no more than now strew the pathway of history under the present conditions. But the wrecks of the evolution will be more than compensated by the infinitely higher possible results, while those of theology have only the vague promise of a future life, without evidence of its reality. As said by Leslie Stephen, "To inculcate reticence at the present moment is simply to advise us to give one more chance to the development of some new form of superstition. If the faith of the future is to be a faith which can satisfy the most cultivated as well as the feeblest intellects, it must be founded on unflinching respect for realities. If its partisans are to win a definitive victory, they must cease to show quarter to lies. The problem is stated plainly enough to leave no room for hesitation."

INDEX

- Absolute Truth, n o t
needed 202
- Albercromby's Maps of
reign of Mohammed-
danism and rainfall 267
- Abstractions, how pro-
duced 229
- African Slavery, an im-
pediment to the proper
evolution of the United
States 280
- Altruism, founded on law
of evolution, 290, its
evolution, 353, strong,
if within reason, 354;
summarized 391, 392
- Agassiz, referred to . . . 37
- Anaesthesia, gives evi-
dence of man's evolu-
tion 34, 35
- Animals, breeding under
domestication, 40, 43,
their mentality, in de-
gree only, different
from man's, 172, 174;
their method of life,
175, those possessed of
touch alone, radically
different from man's,
241, 242; characterized
by the emotions... 245
- Angell, J. R., as to nature
of mind..... 177, 178
- Anglo-Saxon brain su-
perior, 196; 'therefore
skeptical, 257; race,
why ruling power .
..... 274 et seq
- Arabia, not amenable to
Christian religion 275
- Arrested motion, cause of
heat of sun . . . 19, 151
- Arrhenius, on life spores,
27, on the effect of sun
spots 144
- Artificial Selection, 40,
43, 83; has not produced
permanent species 45
- Association Centers of
the brain 10
- Atheist, defined, 320, one
who does not believe
scietific truth, 320,
early Jewish Christians
called 320
- Australia, wanting in
mammalian forms, 38,
in the cretaceous epoch
a part of Asia... 38
- Baldwin, James Mark,
what constitutes an
object 181
- Barbarism, adapted to
capacity of its people,
63; happier than they
would be in civiliza-
tion, 63; no true sla-
very in. 64
- Bastian, H Charlton on
archebiosis 48, 49
- Ball, Sir Robert S in
favor of nebular the-
ory 23, 25
- Belief, of the supernat-
ural by great men, no
proof of its truth, 207,
208; that of one cen-
tury held as supersti-
tion by the next, 208;

- change of, should not be catastrophic, 359, 360, how changed... 361
- Bible, accords with intelligence of the times, 319; not of that, of today 319
- Binet, Alfred, quoted 54, 383
- Boudin, Louis B mobility of the moral idea 326
- Brain, The, an evolution, 54, differences in, 54, not a spirit battery, 126; not sole seat of mind 178
- Buckle, what his history means 254
- Causes of Variation, 49, must not be identified with natural selection 50
- Causes, are not known, 131; idea of personal, how derived, 284; a personal ultimate, not intuition, 287; not essential to man . . . 343
- Carus, Dr Paul, on "mind," 225; on evolution 16
- Cell, a heterogeneous organ, 43, the beginning of all organisms, 27, 28; all alike, 27; composed of four principal elements 154
- Christianity, on its ethical side, 130; character building, 130; everything for glory of God and another world, 260; claims to be real builder of civilization, 265; Christ quoted, 265, 266, should have been introduced sooner, 266, instances of its want of power, 266 et seq, an evolution, 267, pre-ferred by the author, 267, its change since Christ, 267, its spread in Rome, 268, its limitations, 270, could not change fundamentals, 270, certain doctrines borrowed, 270, 271, impressed people already religious.. 272
- Chemistry, deals entirely with substance . . . 152
- Child, has not knowledge until experience establishes a memory.. 187
- Change in Forms, a natural law and a condition of evolution, 5, nothing abiding except matter and motion 5, 6
- Chittenden, Russell H. as to metabolism 123
- Chinese religion includes the essence of Christian ethics..... 261, 262
- Church, always supported divinity of kings, 263, 264, also capitalism and monopoly of land, 264; an evolution, 355, fine edifices of, 355; history of, that of the dark ages, 359; education should not be controlled by..... 359
- Chester, Rev. William, quoted 286
- Christian Doctrine... 386, 387
- Civilization, physical welfare of man, its cause, 59; adapted only to higher intellects, 63; has crimes peculiar to it, 63; slavery and commercialism came with, 64; theories of Comte and Buckle failed for want of historical perspective, 130; basis of, is physical, 254; none

- long survived, 256; enduring founded only on evolution, 256, fatal error in present, 257, 258, a better one resulting from the fading of supernaturalism, 262; present, based in special creation, 303 et seq., followed by one derived from naturalism, 309, its evolution defined, 311, 312, 314, 315, 322; great changes in last 50 years, 323; high according to man's development, 333, Thomas Paine quoted as to, 333, of the past, an evolution handicapped by superstition, 337; order of the evolution of a better, 338, 339; effects of an unreal, 347; a high, produced by Greece and Rome 387, 388
- Civil War, justifiable.. 280
- Classification, contributing evidences to evolution, 29, 31; should be made from the natural facts, 163, based on facts of evolution, 164; man given an artificial place in, 165; more or less superficial, 40; abiding characters of obscure organs, 30; made in groups subordinate to groups..... 30
- Clodd, Edward, insignificance of solar system. 166
- Consciousness, produced by objective things, 6; the aggregate of images, 7; referred to, 160; an awareness of relation, 126, 127; not an objective thing existing in the body, 200; James and Calkins quoted, 226, subject not part of, 226, object in, 226, 227, isomeric molecular motion of nerve tissue, 227, cerebral activity, 228; metabolism of nerve structure, 228, ceases when molecular motion stops, 228, a correspondence between the brain and relations in the objective, 233, has no contents, 233; a passing phase of function, 233; negative evidence of its being a phenomenon.. 246 et seq
- Co-ordination, illustrated by gang of workmen, 198, how produced in brain, 229, 230; prevented by lesion and intoxication 23
- Conservation of energy. 216
- Constitution, and Declaration of Independence, not sentimental. 255
- Confucius and the religion of China.. 259 et seq
- Common Law of England, how made..... 276
- Columbus' Voyage, undertaken for materialistic reasons..... 147
- Colored Children, in schools 187, 188
- Comte's Philosophy, epitomized, 131; his attitude towards psychology 244
- Cognition, the operation in unison of the entire psychical device..... 197
- Comparative anatomy, the homology of structure of man and monkey 32

- Condensation, the principle of matter, 152; Haeckel approves, 152, great discovery, 153, its far reaching effects 155
- Creation, special, referred to, 16; does not account for phenomena, 16; evidences against, 37; facts of geographical distribution against, 39, insignificance of man and his locality, against. . 167
- Cuvier's Classification, 29, 163; not correct. . 164
- Darwin, Erasmus, advocate of evolution, prior to Charles R. 40
- Darwin, Charles R. on the evidences of geology, 31; on the method of evolution, 39 et seq, on the Fuegian character, 62, "Origin of Species" most original book of the 19th century, 73; chapter on him, 75; his personality and work, 75 et seq; his voyage on the "Beagle," 76, a wonderful observer and logician, 81; his sense of fairness, 84, his genius, 84, absolutely honest, 99, discovered and disclosed process of evolution, 100, theory of coral reefs vindicated, 100, 101; honors to him, seldom in public eye, 107; buried in Westminster Abbey, 108, his theory most in accord with observed facts, 109; outlined the origin in 1844, 39; prior naturalists assumed truth of special creation, 40, his idea of classification, 162 et seq., paid no attention to unknowable, 201, failure of other scientists to follow his views, 201, quoted as to variety of beliefs, 306; his researches worthless without his logical conclusion—evolution . . . 349
- Death, in building a strong race, 42, 43; a discontinuance of correspondence with environment, 220; the meaning of, 300; a link in evolution, 300; in Egypt 300
- Delusions of 16th century scientists, 122, 123, universal in the past and prevalent today, 207; not confined to the ignorant. 207
- Descartes, as to a thinking entity, 217; his method unscientific, 218; what it is, 220 et seq.; did not reach beyond death. 223
- Demolin, Edward, "Anglo-Saxon Superiority" 254
- Design, not believed by Darwin, 89, 90, 91, Asa Gray upon, 91; discussed in quotations from Roget, 92 et seq.; illustrations from human productions do not prove, 93 et seq; unreasonableness of the idea, 94; not compatible with phenomena, 249; Paley's illustration not proof. 374
- Decline of Vitality in man the reverse of his evolution 33

- DeVries, referred to, 37;
his mutation theory,
44; in accordance with
this book..... 45
- Dietzgen, quoted ...6, 28
- Domestic Animals, Dar-
win's breeding of..... 43
- Dreams, how produced .
..... 231, 232
- Dualism, of body and
soul not scientific,
monism more compat-
ible 130
- Economics, control the
evolution of human
organism and society,
211, 244, production
and distribution, 282,
evolution of mind and
morals based on..... 282
- Earth, comparatively in-
significant ... 166
- Education consists of
what and its effect, 186,
the highest, 258, the
work of self and not that
of another, 258, 259,
should be natural, 360,
further suggestions. 362, 363
- Ego, as defined, an object
of consciousness, 227, its
physiological - psychol-
ogy, 227 et seq; objec-
tive to the senses, 233;
differentiated species of
phenomena, 248, 249,
summarized, 375; phe-
nomenal, 215; as defined
by Descartes, 217; the
human organism, 219,
220, a psycho-physical
part of matter. ... 220
- Elements, the simple, 22,
23; existing in all
bodies, 23, 153, proof
of evolution from neb-
ula, 23; about 80 of
them, 22, 153; those of
the sun, universal..... 23
- Embryology, evidence of
evolution 28
- Energy, conservation of,
18, 19, aggregate of
work represented in
phenomena, 19, of solar
system, 19; by radia-
tion not lost..... 22
- Emotions, characterized
by physiological marks,
235, 239, only seem-
ingly automatic, 272,
religious ... 272
- Engels, Frederic, quoted 188
- Entity, no separate . . 217
- Environment, and organ-
isms, 47, no adaptation
of, to the animal, 47,
part of evolution, 106,
changes not for man's
benefit.. . 47, 48, 106, 107
- England, example of so-
cial evolution . . 277
- Esthetics, harmonization
of self to higher envi-
ronment, 67; aids life
of species, 71, 72, 243,
how it promotes brother-
hood . . . 244
- Ethics, harmonization of
self and higher envi-
ronment, 67, contrib-
utes to perpetuation of
species, 72; to preser-
vation of self and race,
243; not outgrowth of
supernaturalism, 283,
an evolution, 283; nat-
ural, 295 et seq; pres-
ent code not all unnat-
ural .. . 297
- Ether, a theory of scien-
tific necessity .. 153
- Evolution, a continual
change of form, 11; a
short outline of, 16;
defined by Spencer, 16;
of worlds, from nebu-
lae, 17 to 22; of organic

- forms, 25 et seq; the method of, 39; all phenomena result of, 66, dissipated prior mythical theories, 80, length of time, 85, 86; active now as ever, 85, 86, illustrated by embryology, 86; effect on current theology, 88 et seq; same definition as life, 196; Darwin not first to mention, 90; spoken of by Greeks, 90; its immense purport, 90, Huxley and Spencer, 91, not a work of chance, 94, 95; natural, 95; in touch with phenomena only, 99; misconceptions of the principle, 101 et seq; efforts at reconciliation, 113; geological proofs of, 35, 36, variation, heredity and natural selection, necessary to, 46, the law of rhythm, 150; mental, 191; same as life and cognition, 197; of world bodies, 21, 22; organic, limits of, 200; by locality and neural structure, 200, 201, 25 et seq; applies to social life, 277; to religion, 321; gradually changing current of thought, 342; progress of, in 19th century, 342, 343; subverts theology, 360; summarized, 368 et seq; it works, while mankind thinks it does not 387
- Experience, pure, 160, the test of every proposition, 212; immediate, 233, 234; furnishes the data of natural morality 296
- Faith, not scientific, 205, its comfort illusory 397 et seq
- Faraday, on ultimate unit 158
- Fiction, Fable, modifications of real thing.. 351
- Fiske, John, and his "Outlines of Cosmic Philosophy"....113 et seq.
- Flammarion, — magnetic currents 143
- Force, same as energy, 66, not controlled by man 343, 344, 345
- French, F. C, quoted .. 241
- Freedom of man from authority 262, 263
- Franchise, rights of . 280
- Free Agency 363 et seq
- Freewill 184
- Froude, James A., the use of reason 59
- Function, the motion retained in the organism 190
- Gallepagos Islands, its life forms 38
- Generalizations, how made 229
- Geocentric Idea.. . . 258, 259
- Geographical distribution, gives evidences of evolution.. . . . 37 et seq.
- Girard, Alfred M., on theory of DeVries.. . 44
- Gibbon, oppression of church, 263, divinity of kings, 263; Christians in Rome, 268, his 15th chapter 268
- Glacial epoch, its benefits 104
- Golden Rule, of universal application.. . . 325
- God, not an innate idea, 95, 96; Hobhouse on, 95; producing phenom-

- ena, 19, supposed design not proof, 96; Newton's calculations fell short of, 96, persistence of belief in, 97; facts do not lead to, 98, persistence of force, 98; must be knowable to worshippers, 115, 116, fading away of the idea, 130; human attributes, 136; another idea of, in middle ages and in different times, 315, subject to evolution, 318, religious wars, 321; current idea, erroneous, 336, a man, made infinite 351
- Gray, Asa, on design . . . 107
- Hart, Sir Robert, on Chinese religion 260, 261
- Hallucination, how produced 383, 384
- Haeckel, homology of man and monkey, 32, 33, nature of the will 183, 184
- Heredity and variation, factors in evolution, 50, their meaning 196
- Heterogeneity, defined . . . 42
- Homogeneity, defined . . . 42
- Hobhouse, religion of China, 259, 260, nature of reason 337
- Hoffding, Harold, quoted . . 237
- Howell, W H, the relation of the objective and the subjective . . . 237
- Human Laws, must conform to natural law . . . 291
- Huxley, selective breeding, 45, 46, review in London Times, 88, Monism, 130; psychic life of animal and vegetable 169, 170
- Hylozoism 156
- Ideas, fusion of images, 7, physiological process, 8; produced by nervous structure, 8, how made up, 10; part of the universal order of matter and motion, 234; Spencer's definition, 67; not supernatural, 10, 11; a pattern on brain cortex, 182, 183, contrast between idealist and materialist, 244, 245, certain agreement of 223, 224
- Images, through sense organs, 7, function of, gives ideas 7
- Immediate experience, consciousness 233, 234
- Immortality, a natural . . . 299
- Intellectual tendencies of authors 9
- Inherent tendencies . . . 189
- Inorganic bodies, different from organic, 153; segregation of, 154; ultimate units of, same . . 154
- Indestructibility of matter 216
- Intuition not source of truth 219
- Introspection, 219; the means of self-consciousness 236
- Isomeric molecular motion in nerve tissue . . . 229
- Intellect, the complexity of nerve tissue, 241; only seemingly automatic, 272; retarded by supernaturalism . . . 284, 285
- Industry, rooted in the soil, 255; the foundation of social progress 313, 314
- Inequalities in this life, how remedied 393 et seq.

- Joly, on age of oceans.. 26
- Jordan, President, temperature limits life. .. 166
- Kant and Laplace, their nebular theory 23
- Kautsky, natural morality, 296, character of Esquimo, 296; tools distinguish man from animals 343
- Kellar, Helen, example of vicarious function in brain, 185, mental vision produced by touch 186
- Keplar 205, 206
- Kinship, prime factor in social bond. 271
- Knowledge and knowing, 114, limited to phenomena, 116; relative, 6; chapter on, 162, human, 168 et seq., also 212, 213; summarized 375, 382
- Le Conte, Prof, man's origin 87
- Language, descriptive of phenomena, 14, how evolved.... .. 375 et seq.
- Lamarck, advocate of evolution prior to Darwin 40
- Labriola, quoted. . . . 355
- Laplace and Kant, authors of nebular theory.. 23
- Land, the foundation of life, wealth, etc., 255; laws discussed..... 281
- Lao Tsze, quoted 262
- Law, Human, must conform to natural, 69, 70, the stoics..... 70
- Line of least resistance . 57
- Liebknicht, Wilhelm, quoted 207, 208
- Life, evolution from inorganic, 26 et seq.; germs, 27; an obscure form of matter and motion, 73, 74, 154; began in water, 26, arises now from egg-cells, 27, 28, degree of, in everything, 156; two views of, 159; rhythmic, 161; same as evolution, 196, 197, experiments on origin, 201, a correspondence between a body and environment, 220, derived from material, 258, summarized ... 380
- Limitations and impediments 340
- Linnaeus 29
- Lockyer, Norman, meteoric theory..... 20, 21
- Loeb, Jacques, 84; as to nervous and muscular tissue 226
- Love, A. E. H., tribute to Darwin 100, 101
- Macpherson, decay of theology 315, 316
- Mammalian Life..... 39
- Malthus' theory..... 41
- Man, not created at head, 30; his classification, 163; a vertebrate mammal, 30, still evolving, 65, not descended from present monkeys, 86, 87; scarcely a speck in universe and correspondingly ignorant, 67; not different in mind from animals, 174, 175; advantage of upright position, 176; heredity of ancestral traits, 193; never perfect, 208; his mind an evolution, 209; his psychology and education, 209, 210; needs ethics of common life, 265; the youngest product

- of nature, 289, not manufactured, 302 et seq, his weakness physically, 307, 308, erect position, 343, 344, his limitations, 345, 346, his own power, the type of his God . . . 395, 396
- Marsh's evolution of the horse 36
- Materialistic basis of all things 253
- Materialism 195
- Matter, known only by its attributes, 7, 12, 13, never homogeneous, 21, as wonderful as spirit, 110, 111; producing psychical effects, 128, 129, and motion, the same thing, 138, 139; intelligence of, in certain forms, 167, and motion, fill all space.. 215
- Mentality, our correspondence with relationship, 6, a unit, 136, rhythmic, 148, the aggregate of individual qualities . . . 179
- Memory, what it is..186, 384
- Meteoric hypothesis. . . 20
- Method of evolution.... 39 et seq
- Metaphysics of science, 40; distinctions . . 41
- Mitchell, W, explanation of mind 238
- Mind, aggregation of natural feelings, 58, 169, the cartesian idea of, 65, the common and scientific view, 159; advantages of a trained, 379; not confined to man, 165, in degree, in all animals, 169 et seq; also, in all movement, 170 et seq; no fast line between physical and psychical, 172; brain not sole seat of, 178, not matter, nor spirit, but condition, 183, wholly dependent on structure, 184, 185; infant thinking, not coherent, 221, 222, every treatise tinged with theology, 249; what it is, 285, 286; cannot rise above the natural . . . 289
- Missing links 37
- Mivart, St George, rhythm, 155; its philosophy, 203, 204, his persecution 357, 358
- Morgan, C. Lloyd.. 204, 224
- Monism, 130; its meaning, 156, and monotheism 317
- Momentum and moment of 18
- Montgomery, author of "Racial Descent," 28, 42, 189, 190, evolution of habits 56
- Morphology, gives evidence of evolution, 31 et seq; differs according to locality... . 158
- Molecular Motion, 119, metabolism of the body, 119, 120, same as psychical phenomena, 124, in organic bodies, 154, in brain, 172; cannot be observed, 181, in nerve tissue, 199, 200, part of persistence of force, 228; summarized 371, 372
- Monogomy, result of commercialism, came in with present civilization 61
- Mohammedanism, a rival power to Christianity 266 et seq.

- Morality, chapter on natural, 294, dissociated from supernaturalism, 294, the principle stated, 295, the theological conception of, 296, 297; the decalogue, 297, the aggregate of man's acts, 298, defects in decalogue, 302, second phase of, 306 et seq; an animal impulse, 308; natural, the root of civilization, 312; applicable to every spot, and the golden rule, 325, 327, 328; examples, 326, 328, 329; sanctions of, 392, 393, discussions of 331, 332, 362
- Mueller, Max, on mind and its making 230
- Nature, aggregate phenomena, 14; considers man a part of general phenomena, 107; a selective process, 51; makes no mistake 299
- Nagaeli, quoted 189
- Natural selection, defined, 45, 46; DeVries not opposed to, 44, does not produce variations, 46, 49, 51; maintains types without variation, not so apparent in psychological life, 51, 52; in all organic life, 52, in social life, 65, 68, 69, covers all other modes of evolution, 70, 71; Weissman's belief in, 80, what it means, 84, 85, builds a strong race, 100; negative, 102, Girard's contribution to, 44, altruism, love, etc, 290; summarized 370
- Naturalism and Supernaturalism 288
- Natural Law, 334; laws of society must conform to, 334, 335, any law is natural that harmonizes, 335, no special privileges. 335, 336
- Nebular theory, 17; evidences of 23, 24, nebulae existing throughout space and caused by collisions, 17, 21; of Kant and Laplace 150
- Nervous structure, differentiated protoplasm, 226, in perpetual motion, 227, produces psychological phenomena, 236, high in quality, high in thought, 379; of man and animal compared, 172, 173, neurones about 3,000,000, 173
- Nansen, on Esquimo character 296
- New England, an example 313
- Newcomb, Simon 345
- Neptune, satellites of, 24, 25
- Newton, Sir Isaac, attraction of gravitation, 150, 151; seeing the significance of falling things 194
- Nothing, a relative term. 16
- Objective Apparition, 215, 7, illustrated, 12; nothing but attributes, 13, that and subject defined 204
- Organisms, evolution of, 25 et seq, different from inorganic, 153; developed from egg-cells, 27; multicellular in growth, 28; always adjusted to environment, 47, 48; social,

- creatures of evolution, 60; of economic causes, 61, the human, a psycho-physical unit, 68; the principal elements of, 153, 154, each has its own environment . 224
 Ontological development, parallels the phyletic . 28
 Origin, of matter and motion 341
 Paleontology, gives evidence of evolution . 35
 Persistence of force, 19; acts as a God . .98, 216
 Persistence of belief not evidence of truth 133
 Persistency of types.... 51
 Pearson, Karl, as to mentality 179
 Phenomenism, 6, 12, 136; summarized379, 380
 Phenomena, changing forms, 6; real objects, 13, alike in cause, 11; different phases of same process, 138, few understand, 248; the phases of 368
 Phrenology 180
 Planets, evolution of. 17, 18
 Physical and Psychical both one, 225; physical defined 225
 Philosophy of life . . 9
 Problem, the most important 214
 Politicians support orthodoxy 353
 Polity of nations, how determined 255
 Polarity 158
 Priesthood, the power of 304, 305
 Progress, its limitations104, 105, 106
 Psychology, defined, 6, physiological, 9, 244; its teaching, 351; of reading376 et seq
 Psychological phenomena, unitary with physical, 66; same as molecular motion, 124, part of cosmic energy, 129; produced by a psychical device, 180, its obscurity, etc, 199, analyzed into two parts, 224 et seq; occur through a nervous system, 225, 226, 229, 230, summarized 371 et seq
 Pure experience 385
 Radiation from hot bodies to colder surroundings 22
 Reason, one phase of physiology, 53; a system of images, 54, 186, 187, 384, 385; follows line of least resistance, 57; modified by emotions, preservation of life and objectivity, 58, has certain channels, 59; molecular motion of certain brain centers, 60, arrested reflex, 245, 246, destructive to supernaturalism .. . 274
 "Real" and "Reality" . 293
 Reconciliation of truth and assumption not possible 358
 Reading, how done .376, 377
 Resignation, follows loss of self-assertion... . 356
 Relationship, self to not-self 11
 Religion, an evolution from old ancestor worship, 132, Comte's idea of, 131, 132; should not separate from man's intelligence, 135, 136, the foundations of every, 262; a psycho-

- logical condition, 271,
the present has modified
animism, magic,
etc., 316, changed in
last 50 years, 323, not
free, 365, 366, psychol-
ogy of, summarized
..... 372 et seq
Responsibility, discussed
..... 363 et seq
Review of "Origin of Spe-
cies" in London Times
..... 87, 88
Righteousness defined
and discussed.... 310
Ritchie, author of "Dar-
win and Hegel," on
self-consciousness, 53;
evolution of social or-
ganizations, 65, dual-
ism and monism . . . 130
Rhythm of motion, 141,
illustrated by phenom-
ena on earth, 145 et
seq; fundamental and
universal, 149, evolu-
tion of the universe
under law of, 150, gen-
etic in the atom .151, 152
Roman Catholic Church,
its origin..... 269, 270
Romanes, on evidences
of geology, 35, 36; on
geographical distribu-
tion, 39, on advantages
of civilized man over
savage and animal 55, 56
Rudimentary organs in
man 32
Scientific conclusions
make little impression
on the people, 340, the
reason 346
Separate system, impos-
sible 19, 20
Self-consciousness, dis-
cussed. 234, 235, 236 et seq
Senses, the peripheral,
reduced to touch..... 226
Sensuous perception, the
only evidence of phe-
nomena and truth. . .
..... 12, 13, 219, 301
Science, defined, 205, 206,
goes not beyond the
sensuous, 288, now
making wonderful dis-
coveries, 342, its
achievements in 19th
century . . . 342, 343
Self and not-self, the uni-
verse as a unit . . 203, 204
Sense impressions, trans-
formed images of real
things, 199, how car-
ried to ganglia and
brain 229
Sensory centers, not in-
dependent, 180; respond
to few phenomena
..... 210, 211, 212
Senility, the loss of the
latest acquired func-
tions, 33, the waning
of power of thought 222
Simple Elements 22, 23
Sheep, big-horned, illus-
trate the principles of
evolution . . . 46, 47
Shakespeare, example of
high structure and func-
tion 194, 195
Sherrington, Prof. C S,
functions of nervous
system 235, 236
Shame, another name for
natural morality 296
Shaler, N. S., failings of
theology, 302, changes
in pulpit methods. 323, 324
Sixth Commandment
modified by human
statutes 330
Simple believer, charac-
terized 356, 357
Sleep, what it is... . 231
Skepticism, comes with
higher civilization.. . 257

- Solar System, very insignificant 165, 166
- Soul, monopolized, 165, evidence against its divinity, 246 et seq., a manifestation of the physical, 68, in every thing, 157, two views of, 139, discussed, 249, 250, first announced by Socrates, 388; summary of 388, 389
- Special creation, 16, if true would not change theory, 341, idea of universal 350
- Spectrum proves unity of all bodies 23
- Special organs of sense, the avenues of knowledge 7
- Society, evolved by purely materialistic conditions, 61; in constant change, 64; now crystallized around supernaturalism 354, 355
- Spencer, Herbert, an interpretation of his philosophy, 110 et seq., the "unknowable" no part of his philosophy, 111, first part of "first principles" weakens the whole, 112, illustrations and discussions, 134 et seq.; his real meaning, 138, his definition, 16; his psychology admirable, 249, 250; quoted, 329, 330, not understood 361
- St. Hilliare, an advocate of evolution before Darwin 40
- Subjective, the, 7, what it is, 181, 225, artificial 233
- Sustentation, in determining superiority, 188, 189, illustrated, 191, at bottom of Weissman's theory, 192, in man's evolution 192
- Substance, a combination of matter and motion 57, 152
- Subjective and objective defined 204
- Supernaturalism, deficient of the objective, 205, if abolished, morality will remain, 283, compared to a hot house, 292, responsible for religious persecution, 311, 320, not essential to civilization, 314, order of its evolution, 316, prevents man's progress, 346, its blighting effect 347, 348
- Superstition, slowly dying, 208; devouring valuable time 349
- Sunday, devoted to supernaturalism 355
- Stephen, Leslie, quoted 399
- Summary 368
- Taine, M., as to mind being a polypus of images 382
- Thinking, people should do their own, 367; not possible without nerve matter, 8, a physical process, 218; a passing condition 220
- Thought, determined by the preservation of self or race, 67, 248; argument in support of physical basis, 119; not so wonderful as certain physical phenomena, 126, advantage of molecular theory, 129; in some degree characteristic of all things, 157; the common and

- scientific views, 159;
cannot be measured,
224, accompanied by
physiological marks,
233; the marks, 239,
based on physical ne-
cessity, 242 et seq.,
not free..... 365, 366
Thing-in-its-self .. 13
Theology, its belligerent
attitude .. 347
Theological, ideas of
mind, 285, codes, not
best for making strong
civilization .. 292
Touch, the sense of self-
feeling ... 234
Truth, the criterion of,
117, delusions con-
trolled mankind, 118;
must be relative, 202,
is the universe 203
Universe, follows its own
law 341
Unknowable Absolute,
not existing in the hu-
man senses, 112; Comte
and Buckle ignored it,
115; the scientist ig-
nored it, 116, 117; dis-
cussed, 117; Fiske's
formula modified, 134;
efforts to understand it
futile, 203; the study
of, brings no idea. 9
United States, offspring
of Anglo-Saxon civili-
zation, 277; royalty and
state church omitted
in, 278; land laws in,
discussed, 278; compro-
mises of constitution,
279, example of evolu-
tion of high civiliza-
tion 313
Uranus, satellites of not
in accord 24, 25
Unity of all things.... 205
Upright position of man 176
Variation, and heredity,
factors with natural
selection, 50, what it
is, 45, in brain power,
187, to be useful, what
it must be, 46; illustra-
tions, 46, 47; not in-
herent, 190; causes of,
being tested . 201
Verworn, Max, as to
measurements of psy-
chical phenomena 125
Vestigial organs in man 32
Vivisection, its power to
show successive steps
of mental evolution 33, 34
Vogt, J. C.—condensa-
tion the principal of
matter 152
Volcanic action, and
earthquakes necessary
to high life of man 290, 291
Wallace, Alfred R., his
paper on natural selec-
tion, 39; on variation,
82, on primitive soci-
ety 309, 310
Wealth, economic pro-
duction of, discussed . 282
Weissman, as to deter-
minants and biophers
..... 201, 202
White, Andrew D . 359, 366
Will, modified by the
emotions, 58; governed
by the welfare of self
and race .. 59
Written language, of im-
mense importance. 176, 177
Wundt, William, 9, 10,
on molecular motion
and thought, 120, 121;
quoted 127, 128
Youmans, Prof. E. L.,
friend of Spencer's.... 113

APPENDIX.

1. Note to page 31.

"Constancy of character" (in animal forms) "is what is chiefly valued and sought for by naturalists" (Darwin).

Should the whale eventually change to a terrestrial habitat, its fish-like form would change to an adapted form, but it would still retain its persistent mammalian structure, by which it is classified

2 Notes to page 36.

"Since the 'Origin of Species' was written, our knowledge of that record" (paleontological) "has been enormously extended, and we now possess, no complete volume, it is true, but some remarkably full and illuminating chapters. The main significance of the whole lies in the fact, that just in proportion to *the completeness of the record is the unequivocal character of its testimony to the truth of the evolutionary theory.* The test of a true, as distinguished from a false, theory is the manner in which the newly discovered and unanticipated facts arrange themselves under it. No more striking illustration of this can be found than in the contrasted fates of Cuvier's theory and that of Darwin. Even before Cuvier's death, his views had been undermined, and the progress of discovery soon laid them in irreparable ruin, while the activity of half a century in many different lines of inquiry has established the theory of evolution upon a foundation of ever growing solidity. It is Darwin's imperishable glory that he prescribed the lines along which all the biological sciences were to advance to conquests not dreamed of when he wrote"

W. B. Scott, Professor of Geology in the University of Princeton, in a paper on "The Paleontological Record" in "Darwin and Modern Science," 1909.

"If the doctrine of evolution had not existed, paleontologists must have invented it, so inevitably is it forced upon the mind by the study of the remains of the Tertiary mammalia which have been brought to light since 1859" Huxley p. 241 "Darwiniana" in 1880. Now in 1909, fifty years from the publication of the "Origin of Species," the evidence must be very much more advanced

3. Note to page 38

In the formation of species by evolution through natural

selection geographical distribution is one of the leading proofs. When variations occur in the offspring, which enable them to spread out over a larger habitat than that exclusively occupied by the parent stock, if they happen to cross natural barriers, either of mountains, or water, isolation then takes place. There is not then apt to be co-habitation between the parent stock and the variated offspring. In this case new species will undoubtedly be rapidly formed, not only by virtue of the isolation alone, but be also greatly assisted by the effect of the new environment of new food, air, climate and all those objective phenomena that act upon the senses. But there seems to have been no new species formed in Australia since the cretaceous epoch, because its restricted area seems to contain no barriers to insure isolation. The fauna of the cretaceous period therefore persisted.

4 Note to page 40.

The classification of Linnaeus was largely artificial. It was based on superficial qualities, and special creation. But he was the inventor of the binomial nomenclature a terse formula for description, and fixing attention on species. His classification was not based on internal structure, or anatomical and biological, or generic features. He extended his lists by description of species.

Cuvier classified by comparative anatomy, but still based on fixity of species. He believed in special creation. He conceived four types of animals, the vertebrated, the moluscan, the articulated and the radiated. He first wrote a pamphlet in 1795. He first gave expression to the idea of correlation of parts, viz, that, for instance, a cloven hoof indicated certain forms of other parts. He was the founder of comparative anatomy. But he was also the inventor of catastrophism. He asserted that apparent differences and likenesses of fossil forms in the strata of the earth were caused by the destruction of all life forms in the different epochs, and the special creation of new ones.

Von Baer founded the science of embryology, which supported Cuvier's comparative anatomy. When the theory of evolution was born in 1859 it supplemented Cuvier and Von Baer by eliminating special creation, and substituting close genetic affinities. Embryology and comparative anatomy, after that, had a new meaning for classification. Man was then dethroned from the position of a special artificial order, which Cuvier created for him, and given a family in the order of mammalia. Instead of being created at the head of animals, he had the same genetic origin as all other mammalia. It also became then plain that the line between the different orders, families, genera, and especially of species was not distinct, but

that the distinction became very obscure at the margins and gradually merged into each other

5. Note to page 41.

It is a curious coincidence that Wallace should have independently concluded, as Darwin did, that natural selection is the method of evolution, but still more curious that both should have been pointed to the conclusion, by the reading of Malthus' "Principle of Population."

6 Note to page 46.

"Natural Selection" is merely a term, and perhaps not a very apt one, to indicate the process going on in a state of nature by which the particular forms assumed by matter and motion are perpetuated, or persist, while other such forms do not persist. It is so analagous to what theology has ascribed to a personal creator, or to what man does in breeding animals, or in cultivating vegetables in a garden, that Mr. Darwin and Mr. Wallace both called it "Natural Selection." Mr. Spencer's term "survival of the fittest" better describes the fact, and seems also to make the process appear less a matter of personal intelligence, which the word "selection" in one sense implies. The term "natural selection," however, does not imply the creation of something out of nothing, and therefore is not a full substitute for the theological conception of a personal creator. It does not even create forms from matter and motion. When forms come into existence by the unknown tendencies of what we call the rhythm of motion, and condensation, the perpetuation of some and the annihilation of others, is the process we call "natural selection."

7 Note to page 59.

The reason of man is like the government stamp on a gold coin. It is very limited in its scope. It guarantees the purity, and weight, according to a law arbitrarily adopted by the government itself. That is, according to the reasoning of man. It does not, and cannot guarantee the fixity of its exchangeable value for the products of the world. The natural law of supply and demand, and all economical laws, are made by the interaction of natural readjustments, on the same principle that the law of evolution operates. The reason of man can advance to the point of establishing a currency, uniform in weight and purity; but its real value as currency, in the purchase and sale of commodities, is beyond the reach of legislation. Fifteen years ago it would buy fifty per cent more of wheat, bacon, butter, and eggs than it will now—1911. Then, it was a dollar in the

market. Now it is sixty cents. So it is with everything man reasons out. If it is in accordance with the natural law of evolution—that is, the law of rhythm of motion, and consequent readjustments constantly going on, not only in the inorganic, but in the organic universe, it is righteous, otherwise it is unrighteous, and must be readjusted. I think man is very gradually growing, as the ages elapse, into closer harmony with the natural laws of the universe. The method of development and constant effort is the law of life itself, which likely is all there is of life. When it ceases there is no more life, but a stillness, or want of motion, similar to, or the same as, that condition which we now call death.

8. *Note to page 65.*

Alfred Russell Wallace has argued, that after the development of those intellectual and moral faculties in man, which distinguish him from the lower animals, he would be little liable to bodily modifications through natural selection, or any other means. That is, man through his mental faculties is enabled to keep in harmony with the changing universe, with an unchanged body. Following this essay, or perhaps before, or simultaneously, many opponents of the evolution theory, especially the theologians, took heart, and began to assert that the evolution of reason in man gave him control of his own development, and as to him natural selection did not apply. There is no doubt that man has great power of adapting his habits to new conditions in life. His inventive genius enables him to make tools and implements to aid him, far beyond the power of the lower animals, in his correspondence with a more complex environment. But these inventions enable him to get into touch with more productive sources of natural law, but not to change those laws for his own benefit. This increased mental power comes to him only as his nervous structure increases, so as to bear a larger ratio to his total body, or at least by largely increasing the complexity of his nervous system. While this can be done, perhaps, without changing his outward bodily form, yet it is a change of bodily form internally, and this change is, undoubtedly, continually modifying the whole internal bodily structure. By comparing the head and facial expression of an intellectual white man with a red savage Indian, one can readily comprehend what I mean. Every change in the mental capacity is imaged in the external physical marks of the body.

I do not think that man can ever be entirely freed from the control of biological evolution, by reason of an increase of his psychology, which means his correspondence with his environment. The very fact mentioned by Wallace that man must keep in harmony with the changing universe, means that as the

universe changes man's perception and conception change, and this means a change, or modification of his brain structure, which is a part of his body. Reason is not a spiritual entity, distinct from the body, which works out the welfare of man, while his body, especially his nervous structure, remains unchanged.

9. Note to page 84

"It has often and justly been remarked that what strikes a candid student of Mr Darwin's works is not so much his industry, his knowledge, or even the surprising fertility of his inventive genius, but that unswerving truthfulness and honesty, which never permitted him to hide a weak place, or gloss over a difficulty, but lead him on all occasions, to point out the weak places in his own armor, and even sometimes, it appears to me, to make admissions against himself, which are quite unnecessary. A critic who desires to attack Mr. Darwin has only to read his works with a desire to observe not their merits, but their defects, and he will find ready to hand more adverse suggestions than are likely ever to have suggested themselves to his own sharpness, without Mr. Darwin's self-denying aid"—Huxley, p 184, "Darwiniana"

10 Note to page 91.

John Ray of England wrote a natural history in the 17th century, and in a book entitled "The Wisdom of God Manifested in the Works of the Creation," published in 1691, he anticipated Paley, in the ideas expressed on natural theology. Paley must have borrowed largely from Ray.

11 Notes to page 95

Laplace, in his essay on probabilities, mentions a hypothetical intelligence, which being in possession of the data, should be able to calculate the movements of every atom of matter in the universe for all time.

The term "natural selection" may just as well be used for such intelligence, or the word "evolution" could be substituted, and when Darwin said that forms of matter are determined by evolution, by natural selection, he inductively had arrived at a much more understandable and positive statement of the same principle. Both Laplace and Darwin were very much more correct and logical in thus interpreting the phenomena, apparent to our senses, which are called the universe, than was the theologian, who also invented the term God, or omnipotent creator, as the hypothetical intelligence, as not only the calculator of what every atom would do, but the maker of the atom, and the artificer of its every combination. The principle is ap-

parent to the human senses, but not the personality. These different views are merely the attitudes of different brains. The scientific brain arrives at a natural principle, and there is halted by the limitations of his senses. The theological brain avoids the scientific process, is governed by his imagination, and poetic fancy, in arriving at a personal cause which proves to be an enlargement of his own personality.

Kant and Darwin both saw clearly that man cannot ascribe the universe to either chance or design. "Neither mechanism nor teleology can give an absolute answer to ultimate questions"—Hoffding, p. 464, "Darwin and Modern Science." He would better have said that man is not able to perceive, nor conceive, the ultimate.

12. Note to page 102

"It appears to us to be one of the many peculiar merits of that hypothesis ('the evolution of species') that it involves no belief in a necessary and continual progress of organisms. Again, Mr. Darwin, if we read him aright, assumes no special tendency of organisms to give rise to useful varieties, and knows nothing of needs of development, or necessity of perfection * * * "So far from a gradual progress toward perfection forming any necessary part of the Darwinian creed it appears to us that it is perfectly consistent with indefinite persistence in one state, or with a gradual retrogression"—Huxley in "Darwiniana," pp. 89-90.

13. Note to page 119

Huxley, in commenting on Hume's contention, that thought is produced by the physiology of the brain, page 94 "Hume" says "Surely no one who is cognizant of the facts of the case nowadays doubts that the roots of psychology lie in the physiology of the nervous system. What we call the operations of the mind are the functions of the brain, and the materials of consciousness are products of cerebral activity."

14. Note to page 134.

Attributes, characteristics, in fact all phenomena, are manifestations of the ultimate atoms of matter, in their aggregate, by evolution. The manifestations are those of the interaction of matter and motion, in the evolution of forms. They are not manifestations of a personal entity, but of a knowable power.

15. Notes to page 164.

Cuvier's discoveries furnished the facts to overthrow his own theory of catastrophes. He, however, clung to catastrophism to

the last His investigations of the rich yield of mammalian fossils in the tertiary rocks of Montmartre brought to light two intermediate forms of hoofed quadrupeds The anoplotherium was somewhere between the pigs and the ruminants. The palaeotherium seemed to connect forms so different as the tapir, the rhinoceros and the horse. Yet Cuvier could, or would, not see that these were connecting links in the evolution of new species.

Because the ant is so much more intelligent than other insects is no reason why it should be given a different classification, or withdrawn on that account, and placed in an order by itself

16 Note to page 173.

Huxley, Vol "Hume," p 128 "It will be observed that Hume appears to contrast the 'inference of the animal' with the 'process of argument or reasoning in man.' But it would be a complete misapprehension of his intention, if we were to suppose that he thereby means to imply that there is any real difference between the two processes The 'inference of the animal' is a potential belief of expectation; the process of argument, or reasoning, in man is based upon potential beliefs of expectations, which are found in the man, exactly in the same way, as in the animal. But in man endowed" (this word should not be used by an evolutionist) "with speech, the mental state, which constitutes the potential belief, is represented by a verbal proposition, and thus becomes what all the world recognizes as a belief."

17. Note to page 184.

"What they would really have to do" (the advocates of free agency) "if they would upset the necessarian argument is to prove that they are free to associate any emotion whatever, with any idea whatever, to like pain, as much as pleasure, vice, as much as virtue, in short, to prove whatever may be the fixity of the order of the universe of things, that of thought is given over to chance." Huxley, p. 221, Vol "Hume."

We do things because either emotion or reason both of which are under entire control of a necessary correspondence with an environment, impels us to do those particular things, and no others

18. Note to page 209

These facts show that man is higher in intellect, and therefore in natural morality, than he could have been at any former period. The theological hypothesis that man was created perfect coupled with the fact that he is not now perfect would cause me to despair of the future of the race But when my mind is

convinced of the truth of evolution, that man is descended from a lower form or organism, and has evolved into his present comparative intellectual status, by slow stages of growth and development, there is reason for the liveliest optimism, in the certain hope that he will continue to evolve, and will eventually attain, not to perfection, in the sense, that he will know everything, but very much higher in instinct, reason, perception, and conception, than he is now. This hope is brightened by the further fact that the theory of evolution does not postpone this desirable condition to a vague future life after death, but will come to the race in this life, on this earth.

19. *After word "hobgoblins" p. 219.*

"The notion that truths external to the mind may be known by intuition, or consciousness, independently of observation, and experience, is, I am persuaded, in these times, the great intellectual support of false doctrines, and institutions. By the aid of this theory, every inveterate belief, and every intense feeling, of which the origin is not remembered, is enabled to dispense with the obligation of justifying itself by reason." John Stuart Mill in "Autobiography," pp 225-6. The intuitive theory adopted, for its main support, the evidence of Mathematics, and the cognate branches of Physical Science. But Mill's "System of Logic" attacked this support, and sought to show that these sciences are, also, inductive.

"Our ideas, and concepts, and scientific theories pass for true only so far as they harmoniously lead back to the world of sense." William James, p. 135, "The Meaning of Truth." So that pragmatism is in accordance with the theory of this book, that is, it is materialistic to that extent.

20. *Note after word "process," page 225.*

In other words integration always occurs during a change from a diffused to a less diffused condition of matter. Matter, in a greatly diffused condition, is always in much greater motion, that is contains greater mobility than when it is solid. The lessening of this mobility, into a condition of comparative stability, means the loss of motion, and this motion is said to come back when a change is made from a solid to a fluid, or to a gas. Hence integration means a loss of motion from the substance integrated. The reverse process is the dissipation of matter and the integration of motion. This occurs when a solid is converted into a gas. The organic body, dead, is in process of change from the form of a solid to that of a gas. Hence we call death a change of form. In this change nothing is lost. When the change is complete the weight of the resulting gases is the same as that of the body in the solid form.

21 Note to page 266.

Buckle, p 190, Vol 1, "Introduction" says: "According to the natural order the most civilized countries should be all Protestants, and the most uncivilized ones Catholics. In the average of instances this is actually the case; so that many persons have been led into the singular error of ascribing all modern enlightenment to the influence of Protestantism; overlooking the important fact that until the enlightenment had begun Protestantism was never required.

22. Note to page 267.

As Christianity rose, during the decadance of Greece and Rome, science, and the lessons taught by nature, as well as the thoughts of Aristotle, and the Greek philosophers, were utterly neglected. Metaphysical speculations upon theology and mysticism occupied the minds of the devotees of supernaturalism. They took no interest in the natural and apparent. A sacred, natural history was produced under theological influence, under the title of "Physiologus." This alone served as natural history for a thousand years. It was based on the animals mentioned in the bible, and those of a purely mythical character. These were made symbolical of religious belief. No natural, only supernatural, facts were drawn from them. The unicorn, the pheonix, and such fanciful non-existences were considered of vastly more importance than real animals-and plants, whose biology, and classification were considered of no importance. Traces of this tendency of theology exist in the present day, in the opposition of the church to every advance made in the natural sciences; that in any way traverses the myths, and speculations, of the bible. It is curious that in the renaissance of learning after the period called the dark ages, investigation was not made by studying the laws, and structures, of natural things, and life forms, but translations were made from Aristotle of fifteen centuries preceding. The writings of such pagan and unchristian civilizations were considered the highest wisdom. During those fifteen centuries theology had produced nothing of value in learning. When theology had full swing and the greatest opportunity it did nothing for the intellect of man but everything to keep man in ignorance and superstition.

23 Note to page 274

The literature of the middle ages was made up of the merest rubbish. In one collection there were twenty-five thousand lives of saints. The beliefs thus engendered were such that when real knowledge began to grow, its great impediment was the opposition of those who held these beliefs and superstitions. Supernaturalism was then universal, and ignorance of natural cause

and effect most dense. The Latin and Greek authors were neglected. The trouble with the literature of the present day is that so little of it boldly teaches scientific truth and its logical results. There is a fear on the part of authors to disturb the ancient superstitions and fictions. They thus contribute, not knowledge, but ignorance, and continuations of ancient misconceptions.

Buckle in his "Introduction," page 104, Vol I, says "Real knowledge, the knowledge on which all civilization is based, solely consists in an acquaintance with the relations which things and ideas bear to each other and to themselves; in other words, in an acquaintance with physical and mental laws." The business of education should be directed to the giving of this knowledge.

24 Note to page 286.

"The supreme realities of life" are not these attributes so categorically given by Mr. Chester. They are sustentation, and perpetuation of the race, the maintenance of the organism, and its race, with the knowable laws of nature, the maintenance of society, in the principle of equality of opportunity. Then will follow, as effects of these, the "moral sense, the affections, the beautiful, the true and the good." The latter are the results of the former. "The supreme realities" are materialistic, but they have a physiological function, which is also psychological, and some of them are the attributes recited by Mr. Chester. If primitive man had followed the order, that Mr. Chester lays down, of making the emotions and beliefs of the brain the supreme things in his life, he would very soon have terminated his life. The supreme realities to him were food, shelter, bodily comfort, freedom from disease, and defense against his enemies. If these things were well done, Mr. Chester's catalogue followed as a matter of course, in all essential particulars.

25. After word "Conditions" page 290.

The survival value of altruism perhaps consists of its great power in preserving personal and community morals. It consists of elements, strongly tintured with the preservation of the race. It is the highest form of love, and that is one of the three primitive emotions, whose evolution and survival value are of the utmost importance, in the preservation and perpetuation of the race. Applying to it the principles of pragmatism, which has as its heart, the theory of evolution viz. adaptation, it can be said that the only reason altruism persists is that it fits in and survives, in the working of dynamic life.

26 Note to page 296.

There is not only no universal standard of truth, there is none of morality, nor of beauty. Darwin, in "Descent of Man" says in

regard to beauty: "The men of each race prefer what they are accustomed to; they cannot endure any great change; but they like variety; and they like each characteristic carried to a moderate extreme." The African greatly admires a black skin, flat nose and colored teeth; the European altogether a different type, and the American and Malay still others.

27. Note to page 310.

In 1820 the American missionaries to the Sandwich Islands found the inhabitants living in the lowest stage of savagery. The family was the punaluan, in which, under the laws of the gens half brothers and sisters were living in wedlock. Polygamy and polyandry were both universal. These were the customs and considered perfectly innocent and moral. They undoubtedly were the customs and therefore the legal form, with all people throughout the world, at the same stage of social development, viz the lowest and middle stage of savagery.

The gens was the unit of society, the same as the political township is the unit in civilization now. "The gens consisted of a supposed female ancestry and her children, together with the children of her daughters, and of her female descendants, through females, in perpetuity." The geneology was traced through the mothers, while ours, at the present time, is through the fathers. The law of marriage was, that it could not occur in the same gens, but that each male or female could marry any member of another gens. The children both male and female belonged to the gens of the mother. But if the same father begat children by different wives, of different gens, then these children could legally, and morally, marry each other. So if there were actual marriages in the Sandwich Islands in 1820 of full brother and sister it must have been a relic of a former consanguine marriage law. The immorality consisted in violating the law of the gens, not in complying with the law, whatever that was. Our own ancestors, when they were passing through the same status of savagery, had the same marriage rites under the same forms of the gens. So the missionaries in so strongly condemning what they called the great immorality of the Fijians, were really besmirching the character of their own ancestors, who in the punaluan customs, followed, in their savage and barbaric ages, were as innocent and moral as we are in following the monogamic laws of civilization. There was no immorality in conforming to the laws of the gens, or tribe, and conscience is violated only when the local customs or laws are departed from.

28. Note to page 326.

This principle of moral adjustment to local customs is really the same as that laid down in Adam Smith's "Theory of Moral Sentiments." He says, "Our continual observations upon the con-

duct of others insensibly lead us to form to ourselves certain general rules concerning what is fit and proper either to be done or avoided. * * * It is thus that the general rules of morality are formed." This means that local customs form the morality of the location of such customs.

"When the development of agriculture made a captive neighbor worth more as a slave than as roast meat, the great wrong of roasting him was a natural deduction. But that conclusion was not drawn from anything else that man ever did, or taught, or from any inspiration ever given him during all the thousands of years of his previous labor, philosophisings, and forming of ethical codes." Richardson, in "Industrial Problems."

In fact all advancement in ethics, in art, in literature, in philosophy, in civilization, followed from some new industrial, economic relation discovered by man in nature, making it easier for him to supply his wants.

29. *Note to page 359*

The reason why the people, when they attain political power, as they did in the formation of the Constitution of the United States, divorce church, and state, is that the church in Europe has always supported Monarchy, when Monarchy supported it, and also assisted the monarchs in the oppression of the people; therefore the people distrust it

Buckle, page 218, Vol. I, "Introduction" says that "as soon as Christianity was introduced into northern Europe the sources of history began to be poisoned." The only time the church of England made open opposition to the king was when James II issued his proclamation of liberty of conscience, meaning toleration to Catholics, in 1688. The church of England, and the dissenters joined in opposition to this. Soon after, James II was deprived of his throne by the action of the combined secular and spiritual powers. The secular power opposed him because he was too religious, and the Protestant power, both the Church of England and the dissenters, because he was too tolerant.

In France, the Protestant clergy, early in the seventeenth century, in synod, discouraged the teaching of Greek because it was a pagan language, and also chemistry, because it distracted the mind from spiritual things. Buckle p 269, Vol I, "Introduction," further says, "There is no doubt that in the reign of Charles II the antagonism between physical sciences and the theological spirit was such as to induce nearly the whole of the clergy to array themselves against the sciences and seek to bring them into discredit." It has been so ever since. In the beginning of the Twentieth Century I have heard a Methodist preacher say that science reminded him of a last year's almanic,—out of date. Buckle, page 204, Vol I, "Introduction" says, also, "During many centuries, every government thought it was its bounden duty to

encourage religious truth, and discourage (what it deemed) religious error. The mischief thus produced has been incalculable. Putting aside all other considerations, it is enough to mention its two leading consequences; which are, the increase of hypocrisy and the increase of perjury. The increase of hypocrisy is the inevitable result of connecting any description of penalty with the profession of particular opinions. Whatever may be the case with individuals, it is certain that the majority of men find an extreme difficulty in long resisting constant temptation. And when the temptation comes to them in the shape of honor, and emolument, they are too ready to profess the dominant opinions."

At the present time in England none but members of the Church of England are allowed to teach in the public schools. While this fact is not so apparent in the United States, yet practically none but believers in supernaturalism are allowed to become teachers.

